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ABSTRACT

This document contains vocational education program course standards for exploratory courses, practical arts courses, and job preparatory programs offered at the secondary and postsecondary level as part of the industrial education component in Florida. Curriculum frameworks are provided for 144 programs/clusters; representative topics are as follows: journalism; public works; aeronautical technology; air conditioning/refrigeration/heating; air traffic control; welding; architectural design; automotive technologies; aviation; barbering; barge and boat operation; biomedical equipment; blueprint reading and estimation; boatbuilding; building construction; carpentry; chemical technology; clock, watch, jewelry repair; commercial art; commercial fishing; commercial foods; commercial photography; computer technologies; consumer electronics; culinary management; diesel engine; drafting; drycleaning/laundering; drywall; electricity; electromechanical technology; electronics; engineering technology; film production; gasoline engines; glazing; graphic arts; grooming/salon services; heavy equipment; industrial cooperative education; industrial management technology; industrial machinery; plastics; instrumentation; land surveying; lasers; logistics systems; machining; manufacturing technology; marine mechanics; masonry; metal fabrication; microelectronics; mine safety; motorcycle service; multimedia; music production; occupational safety/health; office machines; optical; painting and decorating; photographic technology; pipe trade; plastering; metal fabrication; printing; pilots; quality assurance; radio and television broadcast programming; recreational vehicles; residential appliance and refrigeration repair; roofing; school bus driving; sheet metal; solar heating; space engineering; stationary energy; surveying/mapping; swimming pool maintenance; publications technology; telecommunications; television production; theater technology; tile setting; tractor/trailer body repair; upholstery/furniture refinishing; vending machine repair; and welding

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technology. Each curriculum framework includes some or all of the following: program title, occupational area, grade level, length, certification awarded; major concepts/content covered in the course; laboratory activities; special notes; and intended outcomes. (KC)

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VOCATIONAL EDUCATION PROGRAM COURSES STANDARDS

July 1997

Industrial Education

ED 409 433

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Office of Educational Research and Improvement
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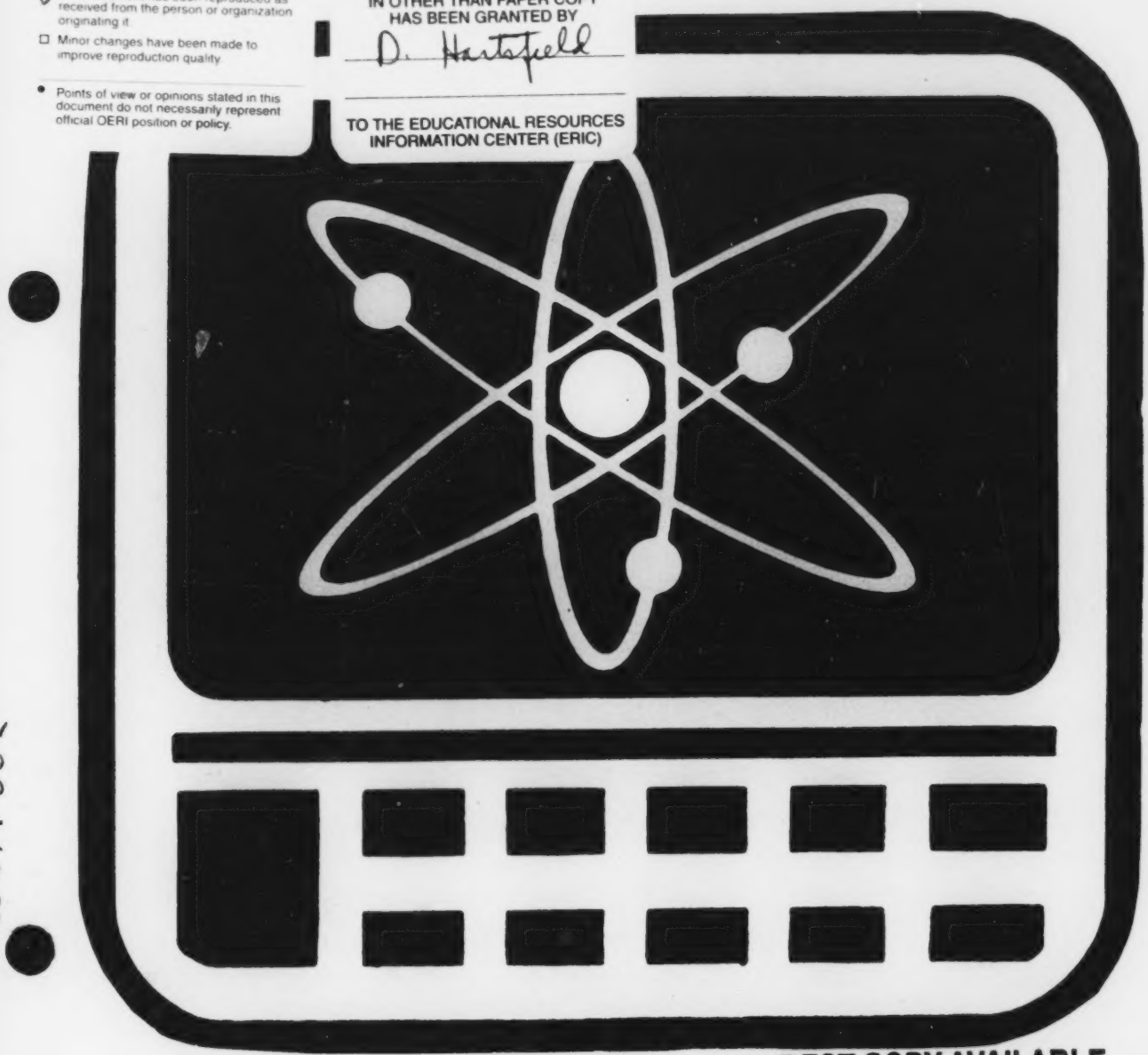

CE 074 352

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VOCATIONAL EDUCATION
PROGRAM COURSE STANDARDS

INDUSTRIAL EDUCATION

July 1997

FLORIDA DEPARTMENT OF EDUCATION
DIVISION OF APPLIED TECHNOLOGY AND ADULT EDUCATION
BUREAU OF SYSTEM IMPLEMENTATION AND TECHNICAL ASSISTANCE
Tallahassee, Florida 32399-0400

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FOREWORD

Section 228.041 Florida defines vocational education as meaning that instruction not necessarily leading to a baccalaureate degree, either graded or upgraded, listed below:

1. Job/preparatory programs designed to provide students with the minimum competencies necessary for effective entry into an occupation;

2. Exploratory courses designed to give students initial exposure to the skills and aptitudes associated with a broad range of occupations in order to assist them in making informed decisions regarding their future academic and occupational goals;

3. Supplemental programs designed to enable persons who are or have been employed in an occupation to upgrade their competencies in order to reenter or maintain employment or advance within their current occupation;

4. Practical arts courses designed to teach students practical generic skills which, though applicable to some occupations, are not designed to prepare students for entry into a specific occupation; or

5. Instruction which integrates the basic academic skills and vocational skills.

This document contains vocational education program courses standards (curriculum frameworks and student performance standards) for exploratory courses, practical arts courses and job preparatory programs offered at the secondary or postsecondary level as a part of Florida's comprehensive vocational education program. Vocational education program courses standards are established pursuant to Section 239.205, Section 233.011, and Section 232.2454, Florida Statutes, for school districts and community colleges. State Board of Education Rule 6A-6.0571, Criteria for qualification of Special Vocational-Technical Education Program Courses, provides the basis for the development and dissemination of this document.

Each program course standard is composed of two parts: a curriculum framework and student performance standards. The curriculum framework includes four major sections: major concepts/content, laboratory activities, special notes, and intended outcomes. Student performance standards are listed for each intended outcome.

The standards do not prescribe how instruction should be delivered since decisions relative to the delivery of instruction must be made by school districts and community colleges within the context of local conditions. The Division of Applied Technology and Adult Education, Florida Department of Education, supports the belief that competency-based vocational education is the most effective means of providing programs and courses that conform to these established standards.

Program and course standards are based upon competencies required for entry, advancement, and upgrading in occupations in the vocational program areas of Agriculture, Business, Diversified, Health Occupations, Home Economics, Technology, Industrial, Marketing, and Public Service Education. Standards for courses designed for handicapped, disadvantaged, and other special needs persons are also provided. The standards are reviewed annually and revised as needed based upon changes in occupations utilizing input from professional associations, state technical committees, and other representatives of the private sector.

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INTRODUCTION

INDUSTRIAL EDUCATION

Industrial Education is comprised of instructional courses, programs, services, and activities at all educational levels for selected trade and industrial occupations.

Industrial Education is a component of Vocational Education which prepares persons for initial employment and offers opportunities for upgrading or retaining of workers in a wide range of occupational areas. Individuals completing Industrial Programs are qualified to function as skilled, semiskilled or technical workers in activities including layout, design, production, repairing products and commodities or rendering personal services. Industrial Programs include classroom instruction in: technical-related theory, safety, mathematics and science, laboratory and shop tasks requiring manipulative skills, and cooperative education to provide on-the-job experiences. Instruction is provided for apprentices in apprenticeship occupations or for journeymen already employed in industrial occupations.

A recommended sequence of study covering extensive knowledge in a field of specialization is required for completion of an Industrial Education Program that prepares persons to work in direct support of professional trades persons, engineers or technicians.

Vocational Industrial Clubs of America (VICA) provides additional opportunities to develop leadership, civic responsibilities, free enterprise system concepts and an understanding of the world of work in industrial occupations. Such organized activities, under appropriate supervision, are considered an integral part of the overall instructional program.

Reinforcement of basic skills in English, mathematics, and science appropriate for the job preparatory program is provided through Vocational classroom instruction and applied laboratory procedures or practices.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Academy of Journalism
Occupational Area: Industrial Education

Secondary

Program Numbers	**8771100**
CIP Number	0609.999900
Grade Level	9-12, 30, 31
Length	3 credits
Certification	

1006300 Journalism I

ENGLISH	1 @2 @4 @8 @9
JOURNALISM	1 @2 @4
JR HI SCH	@8
MG ENGLISH	C
COMM ART	$7 $G
TV PRO TEC	$7 $G
BUS ED	$1 $2 $4
PHOTOG	$7 $G

8771110 Industrial Communications 1

TV PRO TEC	@7 G
PHOTOG	@7 G
COMM ART	@7 G
ENGLISH	$1 $2 $4 $8 $9
JR HI SCH	$8
MG ENG	$C
BUS ED	$1 $2 $4
JOURNALISM	$1 $2 $4

8209310 Electronic/Desktop Publishing 1

BUS ED	1 @4 @2
ENGLISH	$1 $2 $4 $8 $9
VOE	@7
MG ENG	$C
JR HI SCH	$8
COMM ART	$7 $G
TV PRO TECH	$7 $G
I ART TECH	$1 $2
GEN SHOP	$4
PRINTING	¢7 ¢G
GRAPH ART	$4
JOURNALISM	$1 $2 $4
PHOTOG	$7 $G
TEACH CBE	@7

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to provide a medium where by the student will be given the opportunity for practical hands-on experiences that incorporate academic skills into a real life situation.

The program familiarizes individuals with creative writing, script writing, graphic communications, desktop publishing, television production, photo-journalism, and investigative reporting.

The presentation of subject matter should incorporate team teaching. Activities should utilize a rotational type format so that the student is exposed and reinforced academically and vocationally for each outcome. Listed below are the courses that comprise this program when offered at the secondary level:

1006300 - Journalism I (1 credit)
8771110 - Industrial Communications 1 (1 credit)
8209310 - Electronic/Desktop Publishing 1 (1 credit)

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Journalism industry; planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety, environmental issues.

II. **LABORATORY ACTIVITIES:** Both classroom and laboratory activities are an integral part of this program. Classroom instruction in creative writing, script writing, and investigative reporting techniques are all meant to be reinforced with practical experiences. Putting the individuals written work into a commercially oriented product by utilizing modern multi-media technology should be the cumulative result of all outcomes.

III. **SPECIAL NOTE:** VICA is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with RULE 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Produce writings appropriate to journalistic media.
02.0 Organize and use production modes appropriate to journalistic media, including desktop publishing, keyboarding, photography, commercial art, and television production.
03.0 Plan a set for television production.
04.0 Perform lighting activities for a planned production.

05.0 Demonstrate correct use of basic equipment used in television production.
06.0 Demonstrate ability to identify different types of script copy.
07.0 Demonstrate ability to write script in broadcast style.
08.0 Perform electronic/desktop publishing operations.
09.0 Demonstrate knowledge of electronic/desktop publishing concepts.
10.0 Perform mechanical creative support operations.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Academy of Journalism
Secondary Number: 8771100
Postsecondary Number:

01.0 PRODUCE WRITING APPROPRIATE TO JOURNALISTIC MEDIA--The student will be able to:

- 01.01 Write headlines and captions for a variety of journalistic activities.
- 01.02 Identify the "who, what, when, where, and how" components of a news story.
- 01.03 Write a news story in acceptable journalistic style.
- 01.04 Write a sports article using news style and appropriate jargon.
- 01.05 Write an editorial of commendation, condemnation, or both, offering observations and/or criticisms.
- 01.06 Write a feature story that adheres to acceptable column style.
- 01.07 Describe how copyright law pertains to professional and educational use of other writers' materials.
- 01.08 Write copy for a variety of journalistic media (television, radio, magazines, etc.)

02.0 ORGANIZE AND UTILIZE PRODUCTION MODES APPROPRIATE TO JOURNALISTIC MEDIA--The student will be able to:

- 02.01 Identify the principles of layout design.
- 02.02 Identify the basic elements necessary to produce a good photograph.
- 02.03 Describe how the use of photograph or photograph idea extends the written word.
- 02.04 Identify equipment appropriate for production of a variety of journalistic media.
- 02.05 Identify principles of advertising.
- 02.06 Identify proofreading symbols.

03.0 PLAN A SET FOR TELEVISION PRODUCTION--The student will be able to:

- 03.01 Prepare television set for a planned production.
- 03.02 Draw and design a set plan to scale.
- 03.03 Select and arrange state props.
- 03.04 Utilize hand tools to construct scene components.
- 03.05 Inspect and repair scenery as needed.

04.0 PERFORM LIGHTING ACTIVITIES FOR A PLANNED PRODUCTION--The student will be able to:

- 04.01 Describe types of lighting fixtures.
- 04.02 Identify parts of lighting fixtures.
- 04.03 Perform special effects lighting.
- 04.04 Set-up appropriate lighting for a production.
- 04.05 Describe functions of master lighting panel and dimmer board.

04.06 Operate master lighting panel to dimmer board.
04.07 Analyze lighting needs for production.

05.0 DEMONSTRATE CORRECT USE OF BASIC EQUIPMENT USED IN TELEVISION PRODUCTION--The student will be able to:

05.01 Load, record and play a video tape.
05.02 Demonstrate the steps necessary to set up, turn on and operate a video camera.
05.03 Demonstrate picture composition.
05.04 Identify, select and demonstrate use of an appropriate microphone.
05.05 Identify the qualities of a good audio track.
05.06 Demonstrate basic television lighting.
05.07 Explain the care, storage and use of television hardware and software.

06.0 DEMONSTRATE ABILITY TO IDENTIFY DIFFERENT TYPES OF SCRIPT COPY--The student will be able to:

06.01 Identify scripts by format.
06.02 Define terminology used in broadcast script writing.

07.0 DEMONSTRATE ABILITY TO WRITE SCRIPT IN BROADCAST STYLE--The student will be able to:

07.01 Plan and produce a storyboard.
07.02 Specify steps leading to broadcast scripts.
07.03 rite broadcast scripts.

08.0 PERFORM ELECTRONIC/DESKTOP PUBLISHING OPERATIONS--The student will be able to:

08.01 Identify machine specifications and functions.
08.02 Prepare computer printer and scanner for operations.

09.0 DEMONSTRATE KNOWLEDGE OF ELECTRONIC/DESKTOP PUBLISHING CONCEPTS--The student will be able to:

09.01 Identify the skills needed by an electronic desktop publisher.
09.02 Identify significant developments in the electronic/desktop publishing industry.
09.03 Define commonly used terms in graphic communications.
09.04 Identify characteristics of paper.
09.05 Identify software used in electronic/desktop publishing.

10.0 PERFORM MECHANICAL CREATIVE SUPPORT OPERATIONS--The student will be able to:

10.01 Identify characteristics of type, type families, type series, and type styles.
10.02 Identify elements of design.
10.03 Copy, fit, and markup (specify type sizes and styles).
10.04 Paste up mechanical elements electronically.

10.05 Check and compare completed mechanical to comprehensive layout for final proofing.

10.06 Prepare rough layout design.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 1006300
Course Title: Journalism I
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to provide instruction in basic aspects of journalism and workshop experiences in journalistic production. The content should include, but not be limited to the following:

Recognition of and writing news for journalistic media development of editorials, sports articles, and feature stories workshop experiences in photography, layouts, advertising, printing, and other practical aspects of journalistic enterprise.

01.0 PRODUCE WRITING APPROPRIATE TO JOURNALISTIC MEDIA--The student will be able to:

- 01.01 Write headlines and captions for a variety of journalistic activities.
- 01.02 Identify the "who, what, when, where, and how" components of a news story.
- 01.03 Write a news story in acceptable journalistic style.
- 01.04 Write a sports article using news style and appropriate jargon.
- 01.05 Write an editorial of commendation, condemnation, or both, offering observations and/or criticisms.
- 01.06 Write a feature story that adheres to acceptable column style.
- 01.07 Describe how copyright law pertains to professional and educational use of other writers' materials.
- 01.08 Write copy for a variety of journalistic media (television, radio, magazines, etc.)

02.0 ORGANIZE AND UTILIZE PRODUCTION MODES APPROPRIATE TO JOURNALISTIC MEDIA--The student will be able to:

- 02.01 Identify the principles of layout design.
- 02.02 Identify the basic elements necessary to produce a good photograph.
- 02.03 Describe how the use of photograph or photograph idea extends the written word.
- 02.04 Identify equipment appropriate for production of a variety of journalistic media.
- 02.05 Identify principles of advertising.
- 02.06 Identify proofreading symbols.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8771110
Course Title: Industrial Communications
Course Credit: 1

COURSE DESCRIPTION:

03.0 PLAN A SET FOR TELEVISION PRODUCTION--The student will be able to:

- 03.01 Prepare television set for a planned production.
- 03.02 Draw and design a set plan to scale.
- 03.03 Select and arrange state props.
- 03.04 Utilize hand tools to construct scene components.
- 03.05 Inspect and repair scenery as needed.

04.0 PERFORM LIGHTING ACTIVITIES FOR A PLANNED PRODUCTION--The student will be able to:

- 04.01 Describe types of lighting fixtures.
- 04.02 Identify parts of lighting fixtures.
- 04.03 Perform special effects lighting.
- 04.04 Set-up appropriate lighting for a production.
- 04.05 Describe functions of master lighting panel and dimmer board.
- 04.06 Operate master lighting panel to dimmer board.
- 04.07 Analyze lighting needs for production.

05.0 DEMONSTRATE CORRECT USE OF BASIC EQUIPMENT USED IN TELEVISION PRODUCTION--The student will be able to:

- 05.01 Load, record and play a video tape.
- 05.02 Demonstrate the steps necessary to set up, turn on and operate a video camera.
- 05.03 Demonstrate picture composition.
- 05.04 Identify, select and demonstrate use of an appropriate microphone.
- 05.05 Identify the qualities of a good audio track.
- 05.06 Demonstrate basic television lighting.
- 05.07 Explain the care, storage and use of television hardware and software.

06.0 DEMONSTRATE ABILITY TO IDENTIFY DIFFERENT TYPES OF SCRIPT COPY--The student will be able to:

- 06.01 Identify scripts by format.
- 06.02 Define terminology used in broadcast script writing.

07.0 DEMONSTRATE ABILITY TO WRITE SCRIPT IN BROADCAST STYLE--The student will be able to:

- 07.01 Plan and produce a storyboard.

07.02 Specify steps leading to broadcast scripts.
07.03 Write broadcast scripts.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8209310
Course Title: Electronic/Desktop Publishing 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop skill in the entry-level requirements of electronic/desktop publishing and camera-ready copy. The content includes composition, copy preparation, layout design, and measurements. The use of computers is required.

08.0 PERFORM ELECTRONIC/DESKTOP PUBLISHING OPERATIONS--The student will be able to:

- 08.01 Identify machine specifications and functions.
- 08.02 Prepare computer printer and scanner for operations.

09.0 DEMONSTRATE KNOWLEDGE OF ELECTRONIC/DESKTOP PUBLISHING CONCEPTS--The student will be able to:

- 09.01 Identify the skills needed by an electronic desktop publisher.
- 09.02 Identify significant developments in the electronic/desktop publishing industry.
- 09.03 Define commonly used terms in graphic communications.
- 09.04 Identify characteristics of paper.
- 09.05 Identify software used in electronic/desktop publishing.

10.0 PERFORM MECHANICAL CREATIVE SUPPORT OPERATIONS--The student will be able to:

- 10.01 Identify characteristics of type, type families, type series, and type styles.
- 10.02 Identify elements of design.
- 10.03 Copy, fit, and markup (specify type sizes and styles).
- 10.04 Paste up mechanical elements electronically.
- 10.05 Check and compare completed mechanical to comprehensive layout for final proofing.
- 10.06 Prepare rough layout design.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Academy Of Public Works
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	Core/Program/Occupational Completion Point

	Secondary	PSAV
Program Numbers	**8744000**	**I470304**
CIP Number	0615049903	0615049903
Grade Level	9-12, 30, 31	30, 31
Length	3 Credits	450 Hours
Certification	ANY VOC FIELD OR COVERAGE	ANY VOC FIELD OR COVERAGE
Facility Code	245	
VSO	VICA	
Coop Method	Yes	
Apprenticeship	Yes	
Basic Skills		
Math		8
Language		8
Reading		8

I. **PURPOSE:** The purpose of this program is to prepare students for entry level employment as county municipal industrial employees. The courses in this program also provide supplemental training for persons previously or currently employed in the public works field.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Public Works industry; planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **PROGRAM STRUCTURE:** This program is a planned sequence of instruction consisting of three credits or 450 hours of instruction.

Students who successfully complete the curriculum may be employed in one of the following job categories: Wastewater worker trainee; water service worker trainee; stormwater service worker trainee; traffic control technician trainee; streets technician trainee; equipment maintenance technician trainee; equipment operator trainee; grounds technician trainee; solid waste worker trainee; or public works technician trainee.

When offered at the secondary level, the program consists of the following courses:

8744010 - Public Works Cadet 1

8744020 - Public Works Cadet 2
8744030 - Public Works Cadet 3

III. **LABORATORY ACTIVITIES**: Students are provided with realistic laboratory experiences during the classroom portion and the internship in the public works field.

IV. **SPECIAL NOTE**: VICA is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

This program may be offered in PSAV courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The cooperative method of instruction (OJT) is appropriate for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan signed by the student, teacher, and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks which are relevant to the occupations which the student has chosen as a career goal. The student must receive compensation for work performed. Internship may be substituted as an alternative due to the short period of time to reinforce competencies. Multiple affiliates are utilized for the externship activities which provide opportunities for the student to achieve program objectives.

In accordance with Rule 6A-10.040, FAC., the minimum basic skill grade levels required for postsecondary adult vocational students to exit the programs in this cluster are listed at the occupational completion points with the program. These grade level numbers correspond to a grade equivalent score obtained on one of the state designated basic skills examinations. If a student does not meet the basic skills level required for completion from the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) or remedial lab. Please reference the Rule for exemptions.

When a secondary student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards which the student must master to earn credit must be specified in the student's individualized educational plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

SCANS Competencies: Instructional strategies for this program must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate the methods to improve students' personal qualities and high-order thinking skills.

V. **INTENDED OUTCOMES**: After successfully completing appropriate course(s) for each occupational completion point of this program, the student will be able to:

PUBLIC WORKS CADET 1 (150 Hours)

01.0 Identify requirements for orientation and safety.
02.0 Identify tools/equipment used in public works.
03.0 Identify basic elements in water treatment.
04.0 Identify basic elements in water distribution.
05.0 Identify basic elements in waste water treatment.
06.0 Identify basic elements in waste water collections.
07.0 Identify basic elements in storm water system.
08.0 Identify basic elements in equipment maintenance.
09.0 Identify basic elements in technical design and drafting.
10.0 Identify basic elements in solid waste.
11.0 Identify basic elements in parks, buildings and grounds.
12.0 Demonstrate employability skills.
13.0 Operate computer using software.

PUBLIC WORKS CADET 2 (150 Hours)

14.0 Identify basic elements in utility locations.
15.0 Identify basic elements in equipment operations.
16.0 Identify basic elements in traffic operations.
17.0 Identify basic elements in public work requiring people skills.
18.0 Identify basic elements in the gas industry.
19.0 Prepare for commercial driving license.

PUBLIC WORKS CADET 3 (150 Hours)

20.0 Demonstrate work ethics.
21.0 Perform designated job skills.

Students must complete the entire 450 hour program. Those not finishing the program at the secondary level, may articulate with the postsecondary program to complete.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Academy Of Public Works
Secondary Number: 8744000
Postsecondary Number: I470304

PUBLIC WORKS CADET 1 (150 Hours)

01.0 IDENTIFY RULES FOR ORIENTATION AND SAFETY--The student will be able to:

- 01.01 Comply with school policies and procedures.
- 01.02 Identify goals of the public works academy.
- 01.03 Demonstrate correct procedures for "CPR"/First Aid.
- 01.04 Describe rules for defensive driving.
- 01.05 Describe principles of "Right to Know".

02.0 IDENTIFY TOOLS AND EQUIPMENT USED IN PUBLIC WORKS--The student will be able to:

- 02.01 Describe use of tools in public works.
- 02.02 Describe use of various equipment used in public works.
- 02.03 Describe safety practices when working with tools.

03.0 DESCRIBE BASIC ELEMENTS IN WATER TREATMENT--The student will be able to:

- 03.01 Describe the importance of water treatment.
- 03.02 Identify sources of water.
- 03.03 Discuss ways of disinfecting water.
- 03.04 Define "PH" Scale.
- 03.05 Identify requirements for certification.
- 03.06 Discuss job opportunities in water treatment.

04.0 DESCRIBE BASIC ELEMENTS IN WATER DISTRIBUTION--The student will be able to:

- 04.01 Identify parts of a distribution system.
- 04.02 Discuss ways of protecting the water system.
- 04.03 Discuss materials used in water distribution.
- 04.04 Identify requirements for certification.
- 04.05 Discuss job opportunities in water distribution.

05.0 DESCRIBE BASIC ELEMENTS IN WASTEWATER TREATMENT--The student will be able to:

- 05.01 List objectives of waste water treatment.
- 05.02 Define wastewater.
- 05.03 List sources of wastewater.
- 05.04 Identify basic steps in wastewater treatment.
- 05.05 Identify requirements for certification.
- 05.06 Discuss job opportunities in wastewater treatment.

06.0 DESCRIBE BASIC ELEMENTS IN WASTEWATER COLLECTIONS--The student will be able to:

06.01 Define wastewater collection system.
06.02 Identify components of a wastewater collection system.
06.03 Identify materials used in wastewater collection systems.
06.04 Identify requirements for certification.
06.05 Discuss job opportunities in wastewater collection.

07.0 DESCRIBE BASIC ELEMENTS IN STORM WATER SYSTEMS--The student will be able to:

07.01 Identify storm water regulations and laws.
07.02 Discuss drainage pipe structures/installation.
07.03 Discuss effects of storm water on the environment.
07.04 Identify requirements for certification.
07.05 Discuss job opportunities in storm water.

08.0 IDENTIFY BASIC ELEMENTS IN EQUIPMENT MAINTENANCE--The student will be able to:

08.01 Identify stationary equipment.
08.02 Describe role of the equipment mechanic.
08.03 Describe qualifications needed to work on stationary equipment.
08.04 Describe career ladder for equipment mechanics.
08.05 Identify mobile equipment.
08.06 Describe role of mobile equipment mechanic.
08.07 Describe qualifications needed to work as mobile equipment mechanic.
08.08 Describe career opportunities for stationary equipment mechanic.

09.0 IDENTIFY BASIC ELEMENTS IN TECHNICAL DESIGN AND DRAFTING--The student will be able to;

09.01 Identify tools and supplies used by drafters and engineers.
09.02 Demonstrate how to read Philadelphia Rod.
09.03 Demonstrate how to set up and level transit.
09.04 Describe career ladder in drafting and engineering.
09.05 Describe job opportunities in engineering..
09.06 Identify use of contract document.
09.07 Identify legal requirements for bidding.

10.0 DESCRIBE BASIC ELEMENTS IN SOLID WASTE DISPOSAL--The student will be able to:

10.01 Identify basic characteristics of solid waste treatment.
10.02 Describe procedure for collecting garbage.
10.03 Describe effect of solid waste on environment.
10.04 Describe career ladder for solid waste disposal.
10.05 Describe job opportunities in the field of solid waste.

11.0 IDENTIFY BASIC ELEMENTS IN PARKS, BUILDINGS AND GROUNDS--The student will be able to:

- 11.01 Define the role of a maintenance worker.
- 11.02 Identify the requirements to work with chemicals.
- 11.03 Identify job opportunities in parks, buildings and grounds.
- 11.04 Recognize careers related to parks, buildings and grounds.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 12.01 Conduct a job search.
- 12.02 Secure information about a job.
- 12.03 Identify documents that may be needed when applying for a job.
- 12.04 Complete a job application.
- 12.05 Demonstrate competence in job interview techniques.
- 12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
- 12.07 Identify acceptable work habits.
- 12.08 Demonstrate knowledge of how to make job changes appropriately.
- 12.09 Demonstrate acceptable employee health habits.

13.0 OPERATE COMPUTER USING SOFTWARE--The student will be able to:

- 13.01 Utilize a CAI package for microcomputer operations.
- 13.02 Ready microcomputers and diskettes for processing.
- 13.03 Load and utilize an application package.

PUBLIC WORKS CADET 2 (150 Hours)

14.0 IDENTIFY BASIC ELEMENTS IN UTILITY LOCATIONS--The student will be able to:

- 14.01 Define utilities.
- 14.02 Identify common utilities.
- 14.03 Discuss private utilities.
- 14.04 Identify surface features.
- 14.05 Discuss job opportunities in utility locations.

15.0 IDENTIFY BASIC ELEMENTS IN EQUIPMENT OPERATIONS--The student will be able to:

- 15.01 Identify heavy equipment used in public works.
- 15.02 Explain safety practices used in equipment operations.
- 15.03 Describe career ladder for equipment operations.
- 15.04 Describe career opportunities as an equipment operator.

16.0 IDENTIFY BASIC ELEMENTS OPPORTUNITIES IN TRAFFIC OPERATIONS--The student will be able to:

16.01 Explain the importance of traffic operations.
16.02 Explain how to minimize liability and litigation.
16.03 Explain career ladder in traffic control.
16.04 Describe the utilization of barricades in the work zone.
16.05 Explain the requirements for certification as a traffic control operator.
16.06 Describe the importance of signs and marketing on streets.
16.07 Describe the importance of street construction.

17.0 IDENTIFY BASIC ELEMENTS IN PUBLIC WORKS REQUIRING PEOPLE SKILLS--The student will be able to:

17.01 Identify skills needed for listening.
17.02 Describe the importance of good attitude.
17.03 Discuss instruments used for evaluation.
17.04 Describe methods of non-verbal communication.
17.05 Describe methods of verbal communication.
17.06 Discuss basic human needs.
17.07 Discuss role of good work ethics.
17.08 Discuss principles of human relations.
17.09 Discuss principles of customer relations.

18.0 DESCRIBE BASIC ELEMENTS IN THE GAS INDUSTRY--The student will be able to:

18.01 Discuss history of gas.
18.02 Identify tools and equipment used in gas industry.
18.03 Discuss safety procedures when using gas.
18.04 Identify requirements for license and certification.
18.05 Identify career opportunities in the gas industry.

19.0 PREPARE FOR COMMERCIAL DRIVING LICENSE--The student will be able to:

19.01 Identify steps for basic vehicle (26,000 lb. truck) inspection.
19.02 Explain the rules for road emergencies.
19.03 Discuss guidelines for night driving.
19.04 Discuss guidelines for controlling speed.
19.05 Identify safety measures for controlling vehicles.
19.06 Discuss air brakes.
19.07 Describe procedures for parallel parking, measured right turn, and backing up.
19.08 Demonstrate pre-trip inspection.
19.09 Discuss road trip.
19.10 Describe procedures for acquiring license. Practical driving experience for the postsecondary students only.

PUBLIC WORKS CADET 3 (150 Hours)

20.0 DEMONSTRATE WORK ETHICS--The student will be able to:

20.01 Demonstrate ethical practices.

20.02 Follow written and oral directions.
20.03 Interact professionally with employer and employees.
20.04 Interact professionally with customers and clients.
20.05 Display positive attitude toward the job.
20.06 Demonstrate loyalty to the training station.

21.0 PERFORM DESIGNATED JOB SKILLS--The student will be able to:

21.01 Apply safety procedures on the job.
21.02 Demonstrate job performance skills as outlined on the training plan.
21.03 Display an acceptable level of productivity and quality control.
21.04 Demonstrate appropriate dress and grooming habits.
21.05 Demonstrate reacting to constructive criticism in a positive manner.
21.06 Communicate effectively with employer and coworkers.
21.07 Demonstrate initiative.
21.08 Demonstrate decision making and problem-solving skills.
21.09 Demonstrate punctually and reliability by working as scheduled.
21.10 Demonstrate interest and enthusiasm for the job and for the training station.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8744010
Course Title: Public Works Cadet 1
Course Credit: 1

COURSE DESCRIPTION:

This is the first course in a planned sequence of instruction. There are 150 hours in this course. This course provides students with competencies in requirements for orientation and safety, employability skills, the operation of computers using software, and the ability to identify basic elements in handling water/waste water, equipment maintenance, technical design and drafting. A further requirement is to identify basic elements in parks, buildings and grounds.

01.0 IDENTIFY RULES FOR ORIENTATION AND SAFETY--The student will be able to:

- 01.01 Comply with school policies and procedures.
- 01.02 Identify goals of the public works academy.
- 01.03 Demonstrate correct procedures for "CPR"/First Aid.
- 01.04 Describe rules for defensive driving.
- 01.05 Describe principles of "Right to Know".

02.0 IDENTIFY TOOLS AND EQUIPMENT USED IN PUBLIC WORKS--The student will be able to:

- 02.01 Describe use of tools in public works.
- 02.02 Describe use of various equipment used in public works.
- 02.03 Describe safety practices when working with tools.

03.0 DESCRIBE BASIC ELEMENTS IN WATER TREATMENT--The student will be able to:

- 03.01 Describe the importance of water treatment.
- 03.02 Identify sources of water.
- 03.03 Discuss ways of disinfecting water.
- 03.04 Define "PH" Scale.
- 03.05 Identify requirements for certification.
- 03.06 Discuss job opportunities in water treatment.

04.0 DESCRIBE BASIC ELEMENTS IN WATER DISTRIBUTION--The student will be able to:

- 04.01 Identify parts of a distribution system.
- 04.02 Discuss ways of protecting the water system.
- 04.03 Discuss materials used in water distribution.
- 04.04 Identify requirements for certification.
- 04.05 Discuss job opportunities in water distribution.

05.0 DESCRIBE BASIC ELEMENTS IN WASTEWATER TREATMENT--The student will be able to:

05.01 List objectives of waste water treatment.
05.02 Define wastewater.
05.03 List sources of wastewater.
05.04 Identify basic steps in wastewater treatment.
05.05 Identify requirements for certification.
05.06 Discuss job opportunities in wastewater treatment.

06.0 DESCRIBE BASIC ELEMENTS IN WASTEWATER COLLECTIONS--The student will be able to:

06.01 Define wastewater collection system.
06.02 Identify components of a wastewater collection system.
06.03 Identify materials used in wastewater collection systems.
06.04 Identify requirements for certification.
06.05 Discuss job opportunities in wastewater collection.

07.0 DESCRIBE BASIC ELEMENTS IN STORM WATER SYSTEMS--The student will be able to:

07.01 Identify storm water regulations and laws.
07.02 Discuss drainage pipe structures/installation.
07.03 Discuss effects of storm water on the environment.
07.04 Identify requirements for certification.
07.05 Discuss job opportunities in storm water.

08.0 IDENTIFY BASIC ELEMENTS IN EQUIPMENT MAINTENANCE--The student will be able to:

08.01 Identify stationary equipment.
08.02 Describe role of the equipment mechanic.
08.03 Describe qualifications needed to work on stationary equipment.
08.04 Describe career ladder for equipment mechanics.
08.05 Identify mobile equipment.
08.06 Describe role of mobile equipment mechanic.
08.07 Describe qualifications needed to work as mobile equipment mechanic.
08.08 Describe career opportunities for stationary equipment mechanic.

09.0 IDENTIFY BASIC ELEMENTS IN TECHNICAL DESIGN AND DRAFTING--The student will be able to:

09.01 Identify tools and supplies used by drafters and engineers.
09.02 Demonstrate how to read Philadelphia Rod.
09.03 Demonstrate how to set up and level transit.
09.04 Describe career ladder in drafting and engineering.
09.05 Describe job opportunities in engineering..
09.06 Identify use of contract document.
09.07 Identify legal requirements for bidding.

10.0 DESCRIBE BASIC ELEMENTS IN SOLID WASTE DISPOSAL--The student will be able to:

10.01 Identify basic characteristics of solid waste treatment.
10.02 Describe procedure for collecting garbage.
10.03 Describe effect of solid waste on environment.
10.04 Describe career ladder for solid waste disposal.
10.05 Describe job opportunities in the field of solid waste.

11.0 IDENTIFY BASIC ELEMENTS IN PARKS, BUILDINGS AND GROUNDS--The student will be able to:

11.01 Define the role of a maintenance worker.
11.02 Identify the requirements to work with chemicals.
11.03 Identify job opportunities in parks, buildings and grounds.
11.04 Recognize careers related to parks, buildings and grounds.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Identify documents that may be needed when applying for a job.
12.04 Complete a job application.
12.05 Demonstrate competence in job interview techniques.
12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
12.07 Identify acceptable work habits.
12.08 Demonstrate knowledge of how to make job changes appropriately.
12.09 Demonstrate acceptable employee health habits.

13.0 OPERATE COMPUTER USING SOFTWARE--The student will be able to:

13.01 Utilize a CAI package for microcomputer operations.
13.02 Ready microcomputers and diskettes for processing.
13.03 Load and utilize an application package.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8744020
Course Title: Public Works Cadet 2
Course Credit: 1

COURSE DESCRIPTION:

This is the second course in a planned sequence of instruction. There are 150 hours in this course. This course provides students with competencies in preparation for a commercial driving license, basic elements in public work requiring people skills and in the gas industry. It further provides basic elements in utility locations, equipment operations, and traffic operations.

14.0 IDENTIFY BASIC ELEMENTS IN UTILITY LOCATIONS--The student will be able to:

- 14.01 Define utilities.
- 14.02 Identify common utilities.
- 14.03 Discuss private utilities.
- 14.04 Identify surface features.
- 14.05 Discuss job opportunities in utility locations.

15.0 IDENTIFY BASIC ELEMENTS IN EQUIPMENT OPERATIONS--The student will be able to:

- 15.01 Identify heavy equipment used in public works.
- 15.02 Explain safety practices used in equipment operations.
- 15.03 Describe career ladder for equipment operations.
- 15.04 Describe career opportunities as an equipment operator.

16.0 IDENTIFY BASIC ELEMENTS OPPORTUNITIES IN TRAFFIC OPERATIONS--The student will be able to:

- 16.01 Explain the importance of traffic operations.
- 16.02 Explain how to minimize liability and litigation.
- 16.03 Explain career ladder in traffic control.
- 16.04 Describe the utilization of barricades in the work zone.
- 16.05 Explain the requirements for certification as a traffic control operator.
- 16.06 Describe the importance of signs and marketing on streets.
- 16.07 Describe the importance of street construction.

17.0 IDENTIFY BASIC ELEMENTS IN PUBLIC WORKS REQUIRING PEOPLE SKILLS--The student will be able to:

- 17.01 Identify skills needed for listening.
- 17.02 Describe the importance of good attitude.
- 17.03 Discuss instruments used for evaluation.
- 17.04 Describe methods of non-verbal communication.
- 17.05 Describe methods of verbal communication.

17.06 Discuss basic human needs.
17.07 Discuss role of good work ethics.
17.08 Discuss principles of human relations.
17.09 Discuss principles of customer relations.

18.0 DESCRIBE BASIC ELEMENTS IN THE GAS INDUSTRY--The student will be able to:

18.01 Discuss history of gas.
18.02 Identify tools and equipment used in gas industry.
18.03 Discuss safety procedures when using gas.
18.04 Identify requirements for license and certification.
18.05 Identify career opportunities in the gas industry.

19.0 PREPARE FOR COMMERCIAL DRIVING LICENSE--The student will be able to:

19.01 Identify steps for basic vehicle (26,000 lb. truck) inspection.
19.02 Explain the rules for road emergencies.
19.03 Discuss guidelines for night driving.
19.04 Discuss guidelines for controlling speed.
19.05 Identify safety measures for controlling vehicles.
19.06 Discuss air brakes.
19.07 Describe procedures for parallel parking, measured right turn, and backing up.
19.08 Demonstrate pre-trip inspection.
19.09 Discuss road trip.
19.10 Describe procedures for acquiring license. Practical driving experience for the postsecondary students only.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8744030
Course Title: Public Works Cadet 3
Course Credit: 1

COURSE DESCRIPTION:

This is the third and final course in a planned sequence of instruction. There are 150 hours in this course. This course provides students with competencies in demonstration of work ethics and how to perform designated jobs skills.

20.0 DEMONSTRATE WORK ETHICS--The student will be able to:

- 20.01 Demonstrate ethical practices.
- 20.02 Follow written and oral directions.
- 20.03 Interact professionally with employer and employees.
- 20.04 Interact professionally with customers and clients.
- 20.05 Display positive attitude toward the job.
- 20.06 Demonstrate loyalty to the training station.

21.0 PERFORM DESIGNATED JOB SKILLS--The student will be able to:

- 21.01 Apply safety procedures on the job.
- 21.02 Demonstrate job performance skills as outlined on the training plan.
- 21.03 Display an acceptable level of productivity and quality control.
- 21.04 Demonstrate appropriate dress and grooming habits.
- 21.05 Demonstrate reacting to constructive criticism in a positive manner.
- 21.06 Communicate effectively with employer and coworkers.
- 21.07 Demonstrate initiative.
- 21.08 Demonstrate decision making and problem-solving skills.
- 21.09 Demonstrate punctually and reliability by working as scheduled.
- 21.10 Demonstrate interest and enthusiasm for the job and for the training station.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Aeronautical Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.080100
Grade Level	College Credits
Length	AS Degree/64
Certification	

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for initial employment as engineering technicians (22599237), research mechanics (002.280-010), flight test data transcribers, or to provide supplemental training for persons previously or currently employed in these occupations.

The content should include, but not be limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and skills to assist aeronautical engineers in collecting research data relevant to the operation of aircraft and the design, testing, and development of propulsion, control and guidance systems of aircraft and aerospace vehicles.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Aeronautical Engineering industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in applied strength of materials, thermodynamics, and electrical/electronic theory. Strong emphasis is placed on instrumentation and guidance and propulsion systems testing and modification.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The standard credit hour length for this program is 64 according to SBR 6A-14.030.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate understanding of fundamentals of aeronautics.
02.0 Demonstrate understanding of aircraft structure and design.
03.0 Demonstrate knowledge of aircraft communication equipment.
04.0 Demonstrate knowledge of aircraft electronic navigation equipment.
05.0 Demonstrate knowledge of aircraft test equipment and recorders.
06.0 Read and interpret Federal Aviation Administration manufacturing regulations.
07.0 Prepare, analyze and evaluate technical reports and data.
08.0 Develop an understanding of manufacturing processes and materials.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate appropriate math skills.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate employability skills.
13.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Aeronautical Technology
Secondary Number:
Postsecondary Number: 0615.080100

01.0 DEMONSTRATE AN UNDERSTANDING OF FUNDAMENTALS OF AERONAUTICS--The student will be able to:

- 01.01 Differentiate between aeronautics and aerodynamics.
- 01.02 State and give examples of Newton's three laws of motion.
- 01.03 Name and compare the four forces of flight.
- 01.04 Describe an airfoil.
- 01.05 State how lift is produced.
- 01.06 Discuss how and why an airplane stalls.
- 01.07 Describe and explain how pilot, vacuum, pressure and engine instruments work.
- 01.08 Explain the magnetic compass.
- 01.09 Apply the methods of analyzing the fundamentals laws relating to the operation of aircraft engines, both reciprocating and jet.
- 01.10 Apply the fundamental laws of aerodynamic forces, moments, thermodynamics and stresses to the performance of engines, and aircraft.
- 01.11 Discuss the development of aircraft engines and structures and their problems in flight.
- 01.12 Describe and apply the Bernoulli's theory to the many aspects of aircraft flight and operation of aircraft parts.

02.0 DEMONSTRATE UNDERSTANDING OF AIRCRAFT STRUCTURE AND DESIGN--The student will be able to:

- 02.01 Describe the construction and operation of the methods of propulsion by propeller, and jet.
- 02.02 Explain the conditions and effects of subsonic, trans-sonic, supersonic and hypersonic flow of gases.
- 02.03 Describe the aircraft units and control surfaces, their purpose, and operation, including fuselage, tail surfaces, and wing surfaces.
- 02.04 State control devices and the methods necessary for operation of aircraft control surfaces.
- 02.05 Discuss the tension and compression exerted on structural parts in flight.

03.0 DEMONSTRATE KNOWLEDGE OF AIRCRAFT COMMUNICATION EQUIPMENT--The student will be able to:

- 03.01 Operate and explain function of VHF radios.
- 03.02 Operate and explain function of UHF radios.
- 03.03 Explain function and frequencies of ELT's.
- 03.04 Utilize proper phraseology in using radios.
- 03.05 Discuss uses and limitations of portable transceivers.

03.06 Explain the principle of basic radio wave theory and its application to radio aids to flight and navigation.

03.07 Explain the concepts and underlying principles of ultra high frequency, LORAN, Microwave, Doppler effect, OMEGA, directional and non-directional antenna.

04.0 DEMONSTRATE KNOWLEDGE OF AIRCRAFT ELECTRONIC NAVIGATION EQUIPMENT--The student will be able to:

04.01 Define radio navigation.
04.02 Explain the magnetic compass.
04.03 Explain VOR navigation.
04.04 Explain the ADF.
04.05 Explain DME and RNAV principles.
04.06 Demonstrate usage of magnetic coordinates.
04.07 Demonstrate and explain the flight computer.
04.08 Explain sectional charts and their use.
04.09 Explain enroute and terminal charts.
04.10 Explain lost communications emergency procedures VFR and IFR.
04.11 Read and interpret aircraft performance charts.
04.12 Plot and explain a cross-country course.
04.13 Define and explain wing tip bearing, Isosceles triangle method, intercepts and Homing.
04.14 Explain Loran principles and operational usage.

05.0 DEMONSTRATE KNOWLEDGE OF AIRCRAFT TEST EQUIPMENT AND RECORDERS--The student will be able to:

05.01 Describe the differences between the various destructive and non-destructive testing methods.
05.02 State the tolerance of acceptable errors in testing machines used for testing specimens for different uses and functions.
05.03 Explain the various methods of testing and related equipment such as by acoustic-signature analysis, compression, electrified particles, gamma rays, infrared methods, magnetic particles, microwave method, by penetrants, by radiation, radiographic, ultrasonic, by X-rays.

06.0 READ AND INTERPRET FEDERAL AVIATION ADMINISTRATION MANUFACTURING REGULATIONS--The student will be able to:

06.01 Explain the portion of the Federal Aviation Act of 1958 as amended, which is generally described as Title VI, Safety Regulations of Civil Aeronautics.
06.02 Explain Section 603 of FAA 1958 relation to aircraft certificates.
06.03 Discuss the Federal Aviation Regulations (FAR's) related to Section 603 of FAA 1958.
06.04 Compare, and describe type certificates, production certificates, and air worthiness certificates.
06.05 Explain Section 603 (a) (2), Section 603 (b), and 603 (c) relating to type, production, and airworthiness certificates.
06.06 State and compare FAR's 21, 23, 25, 27, 29, 31, 33 and 35.

07.0 PREPARE, ANALYZE AND EVALUATE TECHNICAL REPORTS AND DATA--The student will be able to:

07.01 State the five basic guidelines for preparation of technical reports.
07.02 Compare the difference between technical and literary description.
07.03 Describe the techniques used in technical report writing.
07.04 Discuss the arrangement of the technical written report - such as cause and effect, inductive and deductive, enumeration and classification, problems and solution.
07.05 Explain the preparatory work or stages in the process such as the writing, the drafts, use of the library, and polish style.
07.06 List types of reports, and describe use of illustrations.
07.07 Discuss the steps in developing an oral presentation.

08.0 DEVELOP AN UNDERSTANDING OF MANUFACTURING PROCESSES AND MATERIALS--The student will be able to:

08.01 Describe the portion of the Federal Aviation Act of 1958 as amended, which is generally described as Title VI, Safety Regulations of Civil Aeronautics.
08.02 State the Federal Aviation Regulations (FAR's) related to the manufacturing aspect of Section 603 of Title VI, of the Federal Aviation Act of 1958.
08.03 Compare the governing FAR's with the existing state of the art in manufacturing processes and materials for compliance.
08.04 Define and compare the various manufacturing processes, including casting methods, powder metallurgy, forging processes, extrusion processes, metal stamping and forming, machine processes, automatic machines and numerical control, welding processes, assembly method, and protective coatings.
08.05 Describe the various materials - their characteristics and applications, including iron and steel, alloy steels, non-ferrous metals (aluminum, magnesium, copper, zinc, nickel, and alloys) plastics, and ceramics.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and pereimter measurements for rectangles, squares, and cylinders.
10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Identify documents which may be required when applying for a job interview.
12.04 Complete a job application form correctly.
12.05 Demonstrate competence in job interview techniques.
12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
12.07 Identify acceptable work habits.
12.08 Demonstrate knowledge of how to make appropriate job changes.
12.09 Demonstrate acceptable employee health habits.
12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.
13.05 Identify the necessary personal characteristics of a successful entrepreneur.
13.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Air Conditioning, Refrigeration and Heating Systems Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.050100
Grade Level	College Credits
Length	AS Degree/64
Certification	

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as air conditioning and heating technicians (007.181-010) or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, and safe and efficient work practices. The program prepares students to assist in engineering departments or work independently, capable of designing, installing, maintaining and operating small or medium air conditioning, heating or refrigerating systems.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Air Conditioning, Refrigeration and Heating Systems industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in design and fabrication of piping, design, install and service controls and components, electrical wiring diagrams, troubleshoot electrical and mechanical systems, job estimating and code compliance.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has

chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The standard credit hour length for this program is 64 according to SBR 6A.14-030.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate knowledge of orientation procedures.
02.0 Apply basic air conditioning and refrigeration skills.
03.0 Apply tubing piping, soldering and brazing skills.
04.0 Apply basic refrigeration fundamentals skills.
05.0 Apply basic electrical skills.
06.0 Install and service air conditioning and refrigeration electrical systems.
07.0 Install, maintain and repair residential air conditioning systems.
08.0 Install, maintain and repair commercial air conditioning systems.
09.0 Install, maintain and repair commercial refrigeration systems.
10.0 Install, maintain and repair heating systems.
11.0 Apply basic heat gain, heat loss and design skills.
12.0 Demonstrate appropriate communication skills.
13.0 Demonstrate appropriate math skills.
14.0 Demonstrate appropriate understanding of basic science.
15.0 Demonstrate employability skills.
16.0 Demonstrate an understanding of entrepreneurship.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Air Conditioning, Refrigeration And Heating Systems Technology

Secondary Number:

Postsecondary Number: 0615.050100

01.0 DEMONSTRATE KNOWLEDGE OF ORIENTATION PRACTICES--The student will be able to:

- 01.01 Demonstrate understanding of school and shop policies.
- 01.02 Complete course administrative forms and activities.

02.0 APPLY BASIC AIR CONDITIONING AND REFRIGERATION SKILLS--The student will be able to:

- 02.01 Apply safety practices.
- 02.02 Apply basic mathematics skills.
- 02.03 Apply recordkeeping skills.
- 02.04 Install and service tubing and fittings.
- 02.05 Install and service pipe and fittings.
- 02.06 Identify and use hand and power tools.
- 02.07 Identify and use specialized tools.
- 02.08 Write job specifications.
- 02.09 Read blueprints and mechanical drawings.
- 02.10 Prepare, analyze, and evaluate technical reports and data.

03.0 APPLY TUBING, PIPING, SOLDERING AND BRAZING SKILLS--The student will be able to:

- 03.01 Install and service tubing and fittings.
- 03.02 Install and service pipe and fittings.
- 03.03 Use soft soldering practices.
- 03.04 Use brazing practices.

04.0 APPLY BASIC REFRIGERATION FUNDAMENTALS SKILLS--The student will be able to:

- 04.01 Apply basic refrigeration safety practices.
- 04.02 Identify basic refrigeration cycle.
- 04.03 Compare refrigerant pressure to temperature relationships.
- 04.04 Identify and service refrigeration system and components.
- 04.05 Apply dehydration and evacuation procedures.
- 04.06 Service and charge a basic refrigeration system.
- 04.07 Locate and repair refrigeration system leaks.
- 04.08 Test, analyze and replace compressors.
- 04.09 Apply troubleshooting techniques for refrigeration systems.
- 04.10 Design basic refrigeration.

05.0 APPLY BASIC ELECTRICAL SKILLS--The student will be able to:

- 05.01 Apply basic electrical safety practices.

05.02 Identify the nature of electricity.
05.03 Identify magnetism and electromagnetism induction.
05.04 Identify electrical components symbols and diagrams.
05.05 Apply basic electrical theory and calculations.
05.06 Calculate and measure electrical valves in series and parallel circuits.
05.07 Compare alternating to direct current.
05.08 Test electrical components.
05.09 Test single and three phase motors.
05.10 Test capacitors.
05.11 Test solid state components
05.12 Troubleshoot/diagnose electrical circuits.
05.13 Read schematics and diagrams.
05.14 Design electrical systems.

06.0 INSTALL AND SERVICE AIR CONDITIONING AND REFRIGERATION ELECTRICAL SYSTEMS--The student will be able to:

06.01 Install and service electrical components.
06.02 Install and service electrical controls.
06.03 Troubleshoot/diagnose electrical components and controls.
06.04 Test, analyze, remove and replace single phase motors.
06.05 Test, analyze, remove and replace three phase motors.
06.06 Test, analyze, remove and replace thermostatic controls.

07.0 INSTALL, MAINTAIN AND REPAIR RESIDENTIAL AIR CONDITIONING SYSTEMS--The student will be able to:

07.01 Install, test, analyze and repair air to air systems.
07.02 Install, test, analyze and repair water to air systems.
07.03 Install, test, analyze and repair heat pump systems.
07.04 Test and analyze air movement systems.
07.05 Apply local and national codes.
07.06 Design, construct, install and service comfort systems.
07.07 Calculate job cost estimates.

08.0 INSTALL, MAINTAIN AND REPAIR COMMERCIAL AIR CONDITIONING SYSTEMS--The student will be able to:

08.01 Install, test, analyze and repair air to air systems.
08.02 Install, test, analyze and repair water to air systems.
08.03 Install, test, analyze and repair heat pump systems.
08.04 Install, test, analyze and repair chiller systems.
08.05 Test and analyze air movement systems.
08.06 Apply local and national codes.
08.07 Install, service and repair cooling towers.
08.08 Install, service and repair water cooled condensers.
08.09 Install, service and repair water treatment systems.
08.10 Apply accepted industry pipe sizing and installation procedures.
08.11 Calculate, design and layout environmental systems.
08.12 Calculate job cost estimates.

09.0 INSTALL, MAINTAIN AND REPAIR COMMERCIAL REFRIGERATION SYSTEMS--The student will be able to:

09.01 Install, test, analyze and adjust refrigerant pressure regulating devices.
09.02 Test, analyze and replace electrical controls and components.
09.03 Test, analyze and replace defrost systems.
09.04 Test, analyze and replace pump down systems.
09.05 Use various refrigeration equipment electrical diagrams.
09.06 Apply industry accepted piping installation procedures.
09.07 Apply industry pipe sizing standards.
09.08 Install, service and repair ice machines and specialty systems.
09.09 Apply local and national codes.
09.10 Calculate loads, design and layout refrigeration.
09.11 Calculate job cost estimates.

10.0 INSTALL, MAINTAIN AND REPAIR HEATING SYSTEMS--The student will be able to:

10.01 Install, service and repair a gas furnace.
10.02 Install, service and repair an oil furnace.
10.03 Install, service and repair electric furnace.
10.04 Install, service and repair duct heaters.
10.05 Install, service and repair auxiliary heat strips.
10.06 Design, install, service and repair solar heating systems.
10.07 Install, service and repair miscellaneous heating equipment.
10.08 Apply local and national codes.
10.09 Install, service and repair hydronic systems.
10.10 Test and analyze heating air movement systems.
10.11 Calculate loads, design and layout heating systems.
10.12 Calculate job cost estimates.

11.0 DEMONSTRATE BASIC HEAT GAIN, HEAT LOSS AND DESIGN SKILLS--The student will be able to:

11.01 Calculate heating and cooling requirements from specifications.
11.02 Calculate and design air distribution systems.
11.03 Determine air properties by use of psychrometerics.
11.04 Calculate cooling and heating equipment sizes.
11.05 Design, construct and install air movement systems.

12.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

12.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
12.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
12.03 Read and follow written and oral instructions.
12.04 Answer and ask questions coherently and concisely.
12.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
12.06 Demonstrate appropriate telephone/communication skills.

13.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

13.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
13.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
13.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
13.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
13.05 Demonstrate an understanding of federal, state and local taxes and their computation.

14.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

14.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
14.02 Draw conclusions or make inferences from data.
14.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
14.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

15.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

15.01 Conduct a job search.
15.02 Secure information about a job.
15.03 Identify documents which may be required when applying for a job interview.
15.04 Complete a job application form correctly.
15.05 Demonstrate competence in job interview techniques.
15.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
15.07 Identify acceptable work habits.
15.08 Demonstrate knowledge of how to make appropriate job changes.
15.09 Demonstrate acceptable employee health habits.
15.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

16.01 Define entrepreneurship.
16.02 Describe the importance of entrepreneurship to the American economy.
16.03 List the advantages and disadvantages of business ownership.
16.04 Identify the risks involved in ownership of a business.
16.05 Identify the necessary personal characteristics of a successful entrepreneur.
16.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Air Traffic Control
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	N/A
	PSAV
Program Numbers	**I490105**
CIP Number	0649.010500
Grade Level	30, 31
Length	1600 Hours
Certification	AIR CONT @7 G
Facility Code	245
VSO	VICA
Coop Method	Yes
Apprenticeship	No

I. **PURPOSE:** The purpose of this program is to prepare students for initial employment as an air traffic control specialist (193.162-014), or to provide supplemental training for persons previously or currently employed in these occupations.

The content should include, but not be limited to: human relations, communication skills, leadership skills, and employability skills, safe and efficient work practices, Federal Aviation Administration regulations, air traffic control procedures, aviation safety, flight psychology, meteorology, navigation and communications.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Air Traffic Control industry; planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in aircraft guidance systems and aircraft flight control systems in simulations and actual air traffic control environments.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

Students must meet physical and psychological standards required by the Federal Aviation Administration.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 9.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1600 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A

AIR TRAFFIC CONTROL SPECIALIST - DOT Code 193.162-014

01.0 Demonstrate an understanding of fundamentals of aeronautics.
02.0 Solve basic navigation situations.
03.0 Demonstrate an understanding of federal flight rules and regulations.
04.0 Develop an understanding of meteorology.
05.0 Interpret Federal Aviation Administration enroute and terminal charts and rules.
06.0 Demonstrate knowledge and understanding of aircraft engines and systems.
07.0 Demonstrate an understanding of aviation safety.
08.0 Demonstrate an understanding of aviation law.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate appropriate math skills.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate employability skills.
13.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Air Traffic Control
Secondary Number:
Postsecondary Number: I490105

OCCUPATIONAL COMPLETION POINT - DATA CODE A
AIR TRAFFIC CONTROL SPECIALIST - DOT Code 193.162-014

01.0 DEMONSTRATE AN UNDERSTANDING OF FUNDAMENTALS OF AERONAUTICS--The student will be able to:

- 01.01 Differentiate between aeronautics and aerodynamics.
- 01.02 State and give examples of Newton's three laws of motion.
- 01.03 Name and compare the four forces of flight.
- 01.04 Describe an airfoil.
- 01.05 State how lift is produced.
- 01.06 Discuss how and why an airplane stalls.
- 01.07 Describe and explain how pilot, vacuum, pressure and engine instruments work.
- 01.08 Explain the magnetic compass.

02.0 SOLVE BASIC NAVIGATION SITUATIONS--The student will be able to:

- 02.01 Define radio navigation and be able to explain VOR and loran principles.
- 02.02 Define great circle, meridian, longitude, latitude and conic projection.
- 02.03 Explain and understand the sectional charts used in aviation.
- 02.04 Explain VOR navigation, radar, DME and RNAV principles.
- 02.05 Define radial, bearing, tacan, MEA, ASR, IFR, VFR and holding pattern.

03.0 DEMONSTRATE AN UNDERSTANDING OF FEDERAL FLIGHT RULES AND REGULATIONS--The student will be able to:

- 03.01 Explain major portion of Parts 1, 61, 67, 91 and 830 of the Federal Aviation Regulations.

04.0 DEVELOP AN UNDERSTANDING OF METEOROLOGY--The student will be able to:

- 04.01 State the correct names of the major civilian and military weather organizations.
- 04.02 Explain why the military needs its own weather service.
- 04.03 Name and state the function of at least three instruments meteorologists use in gathering weather data.
- 04.04 Name and describe two types of weather satellites.
- 04.05 Interpret weather surface charts, station sequence reports, terminal reports and area forecasts.
- 04.06 Analyze and predict weather using meteorology charts, maps and reports.

05.0 INTERPRET FEDERAL AVIATION ADMINISTRATION ENROUTE AND TERMINAL CHARTS AND RULES--The student will be able to:

05.01 Explain enroute charts and their legend.
05.02 Explain terminal charts and understand the legend.
05.03 Understand the parts 61, 91 of the Federal Aviation Regulations.

06.0 DEMONSTRATE KNOWLEDGE AND UNDERSTANDING OF AIRCRAFT ENGINES AND SYSTEMS--The student will be able to:

06.01 Identify and describe the parts of a reciprocating engine.
06.02 Understand the difference between reciprocating engines and the jet engine.
06.03 Define turbine and ramjet principles.
06.04 Explain the electrical and hydraulic systems on small aircraft.

07.0 DEMONSTRATE AN UNDERSTANDING OF AVIATION SAFETY--The student will be able to:

07.01 Explain dangerous areas around jet aircraft, large propeller driven aircraft and around small general aviation aircraft.
07.02 Identify dangerous weather conditions.
07.03 Differentiate between various causes of airsickness.
07.04 Explain the ATC system as it operates today and the safety aspects.
07.05 Define hypoxia and hyperventilation and list the causes of each.

08.0 DEMONSTRATE AN UNDERSTANDING OF AVIATION LAW--The student will be able to:

08.01 Explain and define liability, pilot in command, owner and other terms used in aviation law.
08.02 Explain the differences between civil and military law as it relates to aviation.
08.03 List and describe the agencies both federal and international that affect aviation laws and regulations.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Identify documents which may be required when applying for a job interview.
12.04 Complete a job application form correctly.
12.05 Demonstrate competence in job interview techniques.
12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
12.07 Identify acceptable work habits.
12.08 Demonstrate knowledge of how to make appropriate job changes.
12.09 Demonstrate acceptable employee health habits.
12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to.

13.01 Identify characteristics of the American enterprise system.
13.02 Define inflation and deflation.
13.03 Illustrate the basic economic questions facing any society.
13.04 Determine the results of a change in demand or a change in supply.
13.05 List factors which contribute to economic growth.
13.06 Identify characteristics of different types of business ownership.
13.07 Choose appropriate action in a situation requiring application of business ethics.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Applied Welding Technologies
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	One Program with Six Occupational Completion Points

	Secondary	PSAV
Program Numbers	**8754500**	**I480500**
CIP Number	0648.050802	0648.050802
Grade Level	9-12, 30, 31	30, 31
Facility Code	245	245
VSO	VICA	VICA
Co-op Method	Yes	Yes
Apprenticeship	Yes	

I. **PURPOSE:** The purpose of this program is to prepare students for employment or advanced training in a variety of occupations in the welding industry. This program also provides supplemental training for persons previously or currently employed in these occupations.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Welding industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **PROGRAM STRUCTURE:** This program is a planned sequence of instruction consisting of six occupational completion points as follows: (1) Welder Helper (819.687-014), (2) Welder, Shielded Metal Arc (810.384-014), (3) Welder, Gas-Tungsten Arc (Industry), (4) Welder, Gas-Metal Arc (Industry), (5) Welder, Combination (819.384-010), (6) Welder, Pipe (Industry). When the recommended sequence is followed, the structure will allow students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training or become an occupational completer.

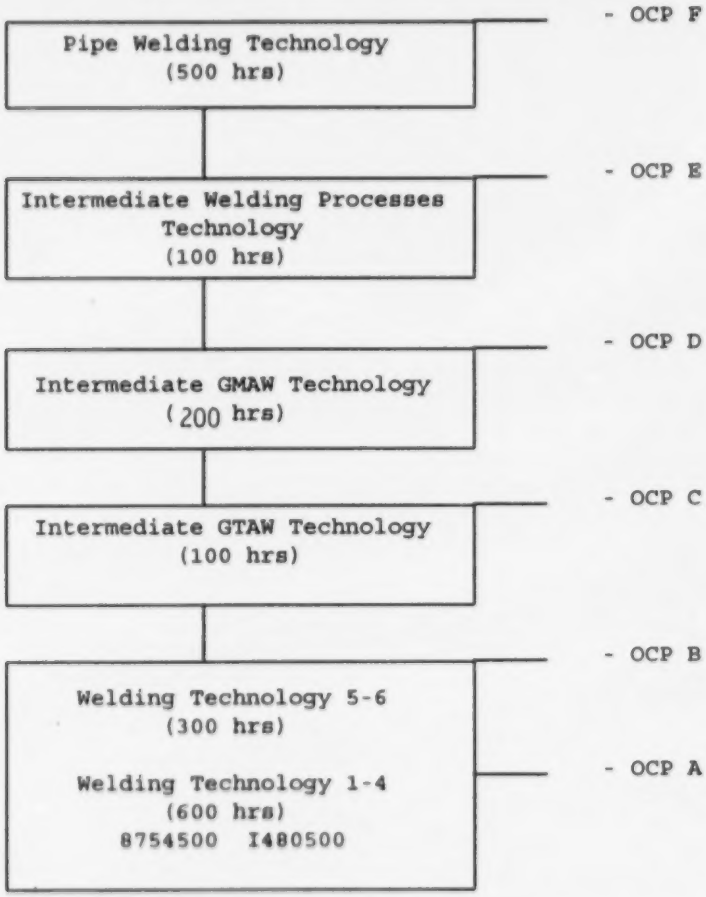
The content includes, but is not limited to, leadership, communication skills, human relations and employability skills, safe and efficient work practices, use of cutting and/or welding processes to fabricate parts, according to shop drawings or written specifications.

Students must complete the core, or demonstrate the mastery of skills standards contained in the core, before advancing to any of the intermediate or advanced courses. Students who complete the

core plus the intermediate courses contained in Combination Welder may be eligible to become a Certified Welder.

The following diagram illustrates the program structure:

APPLIED WELDING TECHNOLOGIES



OCP = Occupational Completion Point

OCP A - Welder Helper (DOT 819.687-014)
OCP B - Welder, Shielded-Metal Arc (DOT 810.384-014)
OCP C - Welder, Gas-Tungsten Arc (Industry Title)
OCP D - Welder, Gas-Metal Arc (Industry Title)
OCP E - Welder, Combination (DOT 819.384-010)
OCP F - Welder, Pipe Making (Industry Title)

When offered at the secondary level, this program consists of the following courses which are the core:

8754510 - Welding Technology 1
8754520 - Welding Technology 2
8754530 - Welding Technology 3
8754540 - Welding Technology 4
8754550 - Welding Technology 5
8754560 - Welding Technology 6

III. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in various processes and techniques of welding and fabrication skills, including thermal cutting, Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding (GMAW), Flux Cored Arc Welding (FCAW), Gas Tungsten Arc Welding (GTAW), Certification Test Preparation, and use of current industry standards, practices and techniques.

IV. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is an appropriate vocational student organization for providing leadership training experiences and reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional program.

The cooperative method of instruction is appropriate for this program. Whenever the cooperative method is offered, the following is required for each student: a training agreement, a training plan signed by the student, teacher and employer, including instructional objectives and a list of on-the-job and in-school learning experiences and a work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must be paid for work performed.

In accordance with Rule 6A-10.0940, FAC, the minimum basic skills grade level required for postsecondary adult vocational students to complete this program are listed at the program level. This grade level number corresponds to a grade equivalent score obtained on one of the state designated basic skills examinations. If a student does not meet the basic skills level required for completion of the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) or remedial lab. Please reference the Rule for exemptions.

When a secondary student with a disability is enrolled in a vocational class with modifications to the program framework, the particular outcomes and student performance standards which the student must master to earn credit must be specified in the student's Individual Education Plan (IEP). Additional credits may be earned when outcomes and
standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designed in the IEP.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

SCANS Competencies: Instructional strategies for this program must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate the methods to improve students' personal qualifications and high-order thinking skills.

Florida Department of Education
INTENDED OUTCOMES

Program Title: Applied Welding Technologies

	Secondary	PSAV
Program Numbers	**8754500**	**I480500**
CIP Number	0648.050802	0648.050802
Grade Level	9-12, 30, 31	30-31
Length	6 Credits + 900 PSAV Hours	1800 Hours
Certification	WELDING @7 G METAL WORK @7 G	WELDING @7 G METAL WORK @7 G
Basic Skills		
Math		7
Language		7
Reading		8

INTENDED OUTCOMES: After successfully completing appropriate course(s) for each occupational completion point of this program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
WELDER HELPER -DOT 819.687-014

01.0 Apply basic shop skills.
02.0 Apply basic oxyfuel gas cutting principles and practices.
03.0 Apply basic shielded metal arc welding (SMAW) skills.
04.0 Apply intermediate shielded metal arc welding (SMAW) skills.
05.0 Apply basic gas tungsten arc welding (GTAW) skills.
06.0 Demonstrate employability skills.
07.0 Apply basic gas metal arc welding (GMAW) skills.

Occupational Completion Point Data Code B
WELDER, SHIELDED METAL ARC - DOT 810.384-014

08.0 Apply drawing and welding symbol interpretation skill.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate an understanding of entrepreneurship.
11.0 Identify metals.
12.0 Demonstrate appropriate math skills.
13.0 Demonstrate appropriate understanding of basic science.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
WELDER, GAS TUNGSTEN ARC - Industry Title

14.0 Apply intermediate gas tungsten arc welding (GTAW) skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE D
WELDER, GAS METAL ARC - Industry Title

15.0 Apply flux cored arc welding (FCAW) skills.
16.0 Apply flux cored arc welding (FCAW) skills.

Occupational Completion Point E

WELDER, COMBINATION - DOT 819.384-010

17.0 Apply intermediate oxyfuel gas cutting principals and practices.
18.0 Demonstrate arc cutting principles and practices.
19.0 Apply visual examination skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE F

WELDER, PIPE - Industry Title

20.0 Fabricate and weld pipe joints.
21.0 Perform fabrication using welding skills.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Applied Welding Technologies
Secondary Number: 8754500
Postsecondary Number: I480500

OCCUPATIONAL COMPLETION POINT - DATA CODE A
WELDER HELPER - DOT Code 819.687-014

01.0 APPLY BASIC SHOP SKILLS--The student will be able to:

- 01.01 Apply communications and leadership skills.
- 01.02 Apply safety and health practices.
- 01.03 Apply measuring skills.
- 01.04 Apply grinding skills.

02.0 APPLY BASIC OXYFUEL GAS CUTTING PRINCIPLES AND PRACTICES--The student will be able to:

- 02.01 Perform safety inspections of equipment and accessories.
- 02.02 Make minor repairs to equipment and accessories.
- 02.03 Set up for plain carbon steel manual OFC operations.
- 02.04 Operate manual oxyfuel cutting equipment.
- 02.05 Perform straight cutting operations on plain carbon steel.

03.0 APPLY BASIC SHIELDED METAL ARC WELDING (SMAW) SKILLS--The student will be able to:

- 03.01 Perform safety inspections of SMAW equipment and accessories.
- 03.02 Make minor repairs to SMAW equipment and accessories.
- 03.03 Set up for plain carbon steel shielded metal arc welding operations.
- 03.04 Operate shielded metal arc welding equipment.
- 03.05 Make fillet welds, all positions, on plain carbon steel.

04.0 APPLY INTERMEDIATE SHIELDED METAL ARC WELDING (SMAW) SKILLS--The student will be able to:

- 04.01 Make groove welds, all positions (visual inspection criteria), on plain carbon steel.
- 04.02 Perform 1G - 3G limited thickness qualification (bend) tests on plain carbon steel plate.

05.0 APPLY BASIC GAS TUNGSTEN ARC WELDING (GTAW) SKILLS--The student will be able to:

- 05.01 Perform safety inspections of GTAW equipment and accessories.
- 05.02 Make minor repairs to GTAW equipment and accessories.

05.03 Set up for plain carbon steel, aluminum and stainless steel GTAW operations.
05.04 Operate gas tungsten arc welding equipment.
05.05 Make fillet welds, all position, on plain carbon steel.

06.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

06.01 Conduct a job search.
06.02 Secure information about a job.
06.03 Identify documents which may be required when applying for a job interview.
06.04 Complete a job application form correctly.
06.05 Demonstrate competence in job interview techniques.
06.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
06.07 Identify acceptable work habits.
06.08 Demonstrate knowledge of how to make job changes appropriately.
06.09 Demonstrate acceptable employee health habits.
06.10 Demonstrate a knowledge of the "Florida Right-to-Know Law" as recorded in Florida Statutes Chapter 442.

07.0 APPLY BASIC GAS METAL ARC WELDING (GMAW) SKILLS--The student will be able to:

07.01 Perform safety inspections of GMAW equipment and accessories.
07.02 Make minor repairs to GMAW equipment and accessories.
07.03 Set up for plain carbon steel gas metal arc welding operations.
07.04 Operate gas metal arc welding equipment.
07.05 Make short-circuiting transfer fillet welds, all positions, on plain carbon steel.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
WELDER, SHIELDED METAL ARC - DOT Code 810.384-014

08.0 APPLY DRAWING AND WELDING SYMBOL INTERPRETATION SKILLS--The student will be able to:

08.01 Interpret basic elements of a drawing or sketch.
08.02 Interpret welding symbol information.
08.03 Fabricate parts from a drawing or sketch.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupational area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.

09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

10.01 Define entrepreneurship.
10.02 Describe the importance of entrepreneurship to the American economy.
10.03 List the advantages and disadvantages of business ownership.
10.04 Identify the risks involved in ownership of a business.
10.05 Identify the necessary personal characteristics of a successful entrepreneur.
10.06 Identify the business skills needed to operate a small business efficiently and effectively.

11.0 IDENTIFY METALS--The student will be able to:

11.01 Identify metals by appearance and weight.
11.02 Identify metals by spark test.
11.03 Classify metals by magnetic properties.
11.04 Identify metals by structural shapes.

12.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

12.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
12.03 Add, subtract, multiply and divide using fractions, decimals and whole numbers.
12.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
12.05 Demonstrate an understanding of federal, state and local taxes and their computation.

13.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

13.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
13.02 Draw conclusions or make inferences from data.
13.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
13.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

OCCUPATIONAL COMPLETION POINT - DATA CODE C

WELDER, GAS TUNGSTEN ARC - Industry Title

14.0 APPLY INTERMEDIATE GAS TUNGSTEN ARC WELDING (GTAW) SKILLS

14.01 Make groove welds, all positions, on plain carbon steel.
14.02 Make 1F - 2F welds on aluminum.
14.03 Make 1G welds on aluminum.

14.04 Make 1F - 3F welds on stainless steel.
14.05 Make 1G - 2G welds on stainless steel.

OCCUPATIONAL COMPLETION POINT - DATA CODE D
WELDER, GAS METAL ARC - Industry Title

15.0 APPLY FLUX CORED ARC WELDING (FCAW) SKILLS

15.01 Make short circuiting transfer groove welds all positions on plain carbon steel.
15.02 Make 1F - 2F Spray transfer welds on plain carbon steel.
15.03 Make G Spray transfer welds on plain carbon steel.

16.0 APPLY FLUX CORED ARC WELDING (FCAW) SKILLS

16.01 Perform safety inspections of equipment and accessories.
16.02 Make minor repairs to equipment and accessories.
16.03 Set up for plain carbon steel FCAW operations.
16.04 Operate flux cored arc welding equipment, self-shielded process.
16.05 Make fillet welds and groove welds, all positions, on plain carbon steel.
16.06 Operate flux cored arc welding equipment, gas-shielded process, to make fillet welds, all positions, on plain carbon steel.

OCCUPATIONAL COMPLETION POINT - DATA CODE E
WELDER, COMBINATION - DOT Code 819.384-010

17.0 APPLY INTERMEDIATE OXYFUEL GAS CUTTING PRINCIPALS AND PRACTICES

17.01 Apply intermediate manual oxyfuel gas cutting skills.
17.02 Perform shape cutting operations on plain carbon steel.
17.03 Perform bevel cutting operations on plain carbon steel.
17.04 Remove weld metal on plain carbon steel using weld washing techniques.
17.05 Apply machine oxyfuel gas cutting (track burner) skills.
17.06 Perform safety inspections of equipment and accessories.
17.07 Make minor repairs to equipment and accessories.
17.08 Set up for plain carbon steel machine OFC (track burner) operations.
17.09 Operate machine oxyfuel gas cutting (track burner) equipment.
17.10 Perform straight cutting operations on plain carbon steel.
17.11 Perform bevel cutting operations on plain carbon steel.

18.0 DEMONSTRATE ARC CUTTING PRINCIPLES AND PRACTICES

18.01 Apply Manual Air Carbon Arc Gouging and Cutting (CAC-A) skills.
18.02 Perform safety inspections of equipment and accessories.
18.03 Make minor repairs to equipment and accessories.
18.04 Set up plain carbon steel manual air carbon arc gouging and cutting operations.
18.05 Operate manual air carbon arc cutting equipment.
18.06 Perform metal removal operations on plain carbon steel.
18.07 Apply manual Plasma Arc Cutting (PAC) skills.
18.08 Perform safety inspections of equipment, accessories.
18.09 Make minor repairs to equipment and accessories.
18.10 Set up for plan carbon steel, aluminum and stainless steel manual plasma arc cutting operations.
18.11 Operate manual plasma arc cutting equipment.
18.12 Perform shape cutting operations on plain carbon steel, aluminum and stainless steel.

19.0 APPLY VISUAL EXAMINATION SKILLS

19.01 Examine cut surfaces and edges of prepared base metal parts.
19.02 Examine tack, intermediate pass and complete welds.

OCCUPATIONAL COMPLETION POINT - DATA CODE F
WELDER, PIPE - Industry Title

20.0 FABRICATE AND WELD PIPE JOINTS

20.01 Prepare pipe joints for welding.
20.02 Set up and weld pipe joints.

21.0 PERFORM FABRICATION USING WELDING SKILLS

21.01 Repair products of ferrous and non-ferrous metals.
21.02 Fabricate products of ferrous and non-ferrous metals.

Program: 8754500 Applied Welding Technologies

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754510
Course Title: Welding Technology 1
Course Credit: 1

COURSE DESCRIPTION:

01.0 APPLY BASIC SHOP SKILLS--The student will be able to:

- 01.01 Apply communications and leadership skills.
- 01.02 Apply safety and health practices.
- 01.03 Apply measuring skills.
- 01.04 Apply grinding skills.

02.0 APPLY BASIC OXYFUEL GAS CUTTING PRINCIPLES AND PRACTICES--The student will be able to:

- 02.01 Perform safety inspections of equipment and accessories.
- 02.02 Make minor repairs to equipment and accessories.
- 02.03 Set up for plain carbon steel manual OFC operations.
- 02.04 Operate manual oxyfuel cutting equipment.
- 02.05 Perform straight cutting operations on plain carbon steel.

03.0 APPLY BASIC SHIELDED METAL ARC WELDING (SMAW) SKILLS--The student will be able to:

- 03.01 Perform safety inspections of SMAW equipment and accessories.
- 03.02 Make minor repairs to SMAW equipment and accessories.
- 03.03 Set up for plain carbon steel shielded metal arc welding operations.
- 03.04 Operate shielded metal arc welding equipment.
- 03.05 Make fillet welds, all positions, on plain carbon steel.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754520
Course Title: Welding Technology 2
Course Credit: 1

COURSE DESCRIPTION:

04.0 APPLY INTERMEDIATE SHIELDED METAL ARC WELDING (SMAW) SKILLS--The student will be able to:

04.01 Make groove welds, all positions (visual inspection criteria), on plain carbon steel.
04.02 Perform 1G - 3G limited thickness qualification (bend) tests on plain carbon steel plate.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754530
Course Title: Welding Technology 3
Course Credit: 1

COURSE DESCRIPTION:

05.0 APPLY BASIC GAS TUNGSTEN ARC WELDING (GTAW) SKILLS--The student will be able to:

- 05.01 Perform safety inspections of GTAW equipment and accessories.
- 05.02 Make minor repairs to GTAW equipment and accessories.
- 05.03 Set up for plain carbon steel, aluminum and stainless steel GTAW operations.
- 05.04 Operate gas tungsten arc welding equipment.
- 05.05 Make fillet welds, all position, on plain carbon steel.

06.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 06.01 Conduct a job search.
- 06.02 Secure information about a job.
- 06.03 Identify documents which may be required when applying for a job interview.
- 06.04 Complete a job application form correctly.
- 06.05 Demonstrate competence in job interview techniques.
- 06.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
- 06.07 Identify acceptable work habits.
- 06.08 Demonstrate knowledge of how to make job changes appropriately.
- 06.09 Demonstrate acceptable employee health habits.
- 06.10 Demonstrate a knowledge of the "Florida Right-to-Know Law" as recorded in Florida Statutes Chapter 442.

Program: 8754500 Applied Welding Technologies

July 199

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754540
Course Title: Welding Technology 4
Course Credit: 1

COURSE DESCRIPTION:

07.0 APPLY BASIC GAS METAL ARC WELDING (GMAW) SKILLS--The student will be able to:

07.01 Perform safety inspections of GMAW equipment and accessories.
07.02 Make minor repairs to GMAW equipment and accessories.
07.03 Set up for plain carbon steel gas metal arc welding operations.
07.04 Operate gas metal arc welding equipment.
07.05 Make short-circuiting transfer fillet welds, all positions, on plain carbon steel.

Program: 8754500 Applied Welding Technologies

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754550
Course Title: Welding Technology 5
Course Credit: 1

COURSE DESCRIPTION:

08.0 APPLY DRAWING AND WELDING SYMBOL INTERPRETATION SKILLS--The student will be able to:

- 08.01 Interpret basic elements of a drawing or sketch.
- 08.02 Interpret welding symbol information.
- 08.03 Fabricate parts from a drawing or sketch.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupational area.
- 09.03 Read and follow written and oral instructions.
- 09.04 Answer and ask questions coherently and concisely.
- 09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 10.01 Define entrepreneurship.
- 10.02 Describe the importance of entrepreneurship to the American economy.
- 10.03 List the advantages and disadvantages of business ownership.
- 10.04 Identify the risks involved in ownership of a business.
- 10.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 10.06 Identify the business skills needed to operate a small business efficiently and effectively.

Program: 8754500 Applied Welding Technologies

July 199

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754560
Course Title: Welding Technology 6
Course Credit: 1

COURSE DESCRIPTION:

11.0 IDENTIFY METALS--The student will be able to:

- 11.01 Identify metals by appearance and weight.
- 11.02 Identify metals by spark test.
- 11.03 Classify metals by magnetic properties.
- 11.04 Identify metals by structural shapes.

12.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 12.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 12.03 Add, subtract, multiply and divide using fractions, decimals and whole numbers.
- 12.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 12.05 Demonstrate an understanding of federal, state and local taxes and their computation.

13.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 13.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 13.02 Draw conclusions or make inferences from data.
- 13.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 13.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Architectural Design and Construction Technology
Occupational Area:	Industrial
	PSV
CIP Number	0615.010100
Grade Level	College Credits
Length	AS Degree/64
Certification	

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as construction planners, or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, assisting architects and architectural engineers in planning and designing structures, using construction materials, and dealing with contracts and specifications.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Architectural Design and Construction industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in model building, construction material utilization, testing materials and examining structures to determine their compliance with building codes and architectural design.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The standard credit hour length for this program is 64 according to SBR 6A-14.030.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Communicate effectively.
02.0 Identify, select, apply, and maintain drafting and graphic materials and equipment.
03.0 Identify construction materials and their application.
04.0 Interpret drawings and documents.
05.0 Interpret and apply basic principles of architectural and engineering design.
06.0 Interpret and apply codes, regulations, and technical literature.
07.0 Produce architectural working drawings.
08.0 Produce structural drawings in steel and concrete.
09.0 Prepare subcontractor shop drawings.
10.0 Survey and assess construction sites.
11.0 Estimate basic quantities.
12.0 Perform office and administrative procedures.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate appropriate math skills.
15.0 Demonstrate appropriate understanding of basic science.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Architectural Design And Construction Technology
Secondary Number:
Postsecondary Number: 0615.010100

01.0 COMMUNICATE EFFECTIVELY--The student will be able to:

- 01.01 Identify communication channels in organizations.
- 01.02 Develop and use effective means of communications.
- 01.03 Develop an effective working relationship with others.
- 01.04 Prepare business correspondence, memos, and reports.
- 01.05 Compose clear and concise oral and written technical reports and presentations.
- 01.06 Participate in technical discussion and meetings.

02.0 IDENTIFY, SELECT, APPLY, AND MAINTAIN DRAFTING AND GRAPHIC MATERIALS AND EQUIPMENT--The student will be able to:

- 02.01 Apply functions of light table.
- 02.02 Use architectural and engineering scales.
- 02.03 Identify and select drawing materials.
- 02.04 Select, apply, and maintain basic drawing instruments.
- 02.05 Identify, apply, and maintain lettering instruments.
- 02.06 Identify and select leads, lead holders, sharpeners and erasers.
- 02.07 Identify and select reproduction materials.
- 02.08 Identify, operate, and maintain reproduction equipment.
- 02.09 Select and apply architectural and engineering curves and templates.
- 02.10 Set up and maintain drafting machine, T square, and parallel rule.
- 02.11 Identify, select, and apply commercial press on graphic materials.
- 02.12 Operate and maintain inking equipment and materials.
- 02.13 Identify, select, and apply color markers and pencils.
- 02.14 Identify, select, and apply water base colors.
- 02.15 Select and apply scribing materials and instruments.
- 02.16 Operate calculators.
- 02.17 Measure area using planimeter.
- 02.18 Identify and apply metric system.
- 02.19 Identify, operate, and maintain photography equipment.
- 02.20 Apply photographic techniques.
- 02.21 Apply and develop lettering and drawing techniques.

03.0 IDENTIFY CONSTRUCTION MATERIALS AND THEIR APPLICATION--The student will be able to:

- 03.01 Identify formwork materials and methods.
- 03.02 Identify concrete materials and applications.
- 03.03 Identify reinforcing steel and applications.
- 03.04 Identify structural steel shapes and applications.

03.05 Identify waterproofing materials and vapor barriers and applications.
03.06 Identify wood construction materials and applications.
03.07 Identify masonry materials and applications.
03.08 Identify exterior finishes and applications.
03.09 Identify insulation materials and applications.
03.10 Identify glass and glazing materials and applications.
03.11 Identify roofing materials and applications.
03.12 Identify flashings and applications.
03.13 Identify adhesives and sealants and applications.
03.14 Identify floor finish materials and applications.
03.15 Identify wall finish materials and applications.
03.16 Identify ceiling finish materials and applications.
03.17 Identify plastic materials and applications.
03.18 Identify miscellaneous metals and applications.
03.19 Identify millwork and applications.
03.20 Identify finish hardware and applications.
03.21 Identify manufactured specialties and applications.
03.22 Identify basic electrical components.
03.23 Identify basic H V A C components.
03.24 Identify basic plumbing components.
03.25 Identify paving materials and applications.
03.26 Identify fire proofing materials and applications.
03.27 Identify applications of pre-engineered and prefabricated structures.

04.0 INTERPRET DRAWINGS AND DOCUMENTS--The student will be able to:

04.01 Interpret technical symbols.
04.02 Interpret topographical drawings.
04.03 Interpret aerial photographs and maps.
04.04 Interpret site drawings.
04.05 Interpret architectural drawings.
04.06 Interpret specifications.
04.07 Interpret addendums.
04.08 Interpret notice of change and change orders.
04.09 Interpret shop drawings.
04.10 Interpret structural drawings.
04.11 Interpret mechanical drawings.
04.12 Interpret electrical drawings.
04.13 Interpret modular approach to buildings.
04.14 Identify and interpret contracts.
04.15 Identify and interpret liens.
04.16 Interpret deeds.
04.17 Interpret master and development plans and documents.

05.0 INTERPRET AND APPLY BASIC PRINCIPLES OF ARCHITECTURAL AND ENGINEERING DESIGN--The student will be able to:

05.01 Conduct and interpret concrete slump test.
05.02 Take test cylinder and interpret results.
05.03 Interpret soil analysis reports.
05.04 Interpret compaction test reports.
05.05 Interpret theory of loads.

05.06 Determine effect of loads on materials.
05.07 Interpret principles of expansion and contraction and control.
05.08 Interpret and apply fundamentals of site requirements.
05.09 Determine and apply space relationships.

06.0 INTERPRET AND APPLY CODES, REGULATIONS, AND TECHNICAL LITERATURE--The student will be able to:

06.01 Interpret and apply graphic and time saver standards.
06.02 Interpret and apply national building codes.
06.03 Interpret and apply C.M.H.C. residential standards.
06.04 Interpret and apply national fire code.
06.05 Interpret and apply provincial codes and regulations.
06.06 Interpret and apply municipal codes and regulations.
06.07 Interpret zoning bylaws and regulations.
06.08 Interpret zoning maps.
06.09 Interpret trade magazines and catalogs.
06.10 Interpret trade manuals.
06.11 Interpret C.I.C.T. manual.
06.12 Interpret yardstick costing manual.
06.13 Interpret and apply C.E.T. regulations.
06.14 Interpret and apply construction association regulations.

07.0 PRODUCE ARCHITECTURAL WORKING DRAWINGS--The student will be able to:

07.01 Prepare floor plan drawings.
07.02 Prepare foundation plan and detail drawings.
07.03 Prepare elevation drawings.
07.04 Prepare landscape layouts.
07.05 Prepare schedules.
07.06 Prepare sections.
07.07 Build architectural models.
07.08 Prepare truss drawings.
07.09 Prepare stairway drawings.
07.10 Prepare fireplace drawings.
07.11 Prepare plot plan drawings.

08.0 PRODUCE STRUCTURAL DRAWINGS IN STEEL AND CONCRETE--The student will be able to:

08.01 Draw beam connections.
08.02 Draw structural assemblies.
08.03 Prepare erection plans.
08.04 Prepare structural drawings.
08.05 Make take-offs from reinforced concrete engineering drawings.
08.06 Prepare footing and foundation drawings.
08.07 Prepare column detail drawings.
08.08 Prepare floor and roof detail drawings.
08.09 Prepare special structure detail drawings.
08.10 Prepare framed beam connection drawings.
08.11 Prepare stiffened seat connection drawings.
08.12 Prepare bolted column detail drawings.
08.13 Prepare gusset plate drawings.

09.0 PREPARE SUBCONTRACTOR SHOP DRAWINGS--The student will be able to:

09.01 Prepare plumbing plan drawings.
09.02 Prepare climate control drawings.
09.03 Prepare electrical plan drawings.

10.0 SURVEY AND ASSESS CONSTRUCTION SITES--The student will be able to:

10.01 Select and apply measuring tapes and chains.
10.02 Prepare site sketches.
10.03 Apply methods of on site measuring.
10.04 Interpret survey books and logs.
10.05 Identify and apply basic principles of levels and rods.
10.06 Identify and apply basic principles of transits.
10.07 Interpret angular and distance measurements to bearings and azimuth.
10.08 Outline basics of site meetings and inspection.

11.0 ESTIMATE BASIC QUANTITIES--The student will be able to:

11.01 Compute area and volume of buildings.
11.02 Estimate quantities of excavation and fill.
11.03 Take off quantities of form work.
11.04 Take off quantities of concrete.
11.05 Take off quantities of lumber.
11.06 Take off quantities of masonry.
11.07 Interpret and complete standard estimators forms.

12.0 PERFORM OFFICE AND ADMINISTRATIVE PROCEDURES--The student will be able to:

12.01 Organize and maintain personal work area.
12.02 Operate office equipment.
12.03 Estimate, order, and maintain drafting supplies.
12.04 Maintain file drawing systems.
12.05 Maintain record of building costs.
12.06 Develop and maintain technical reference library.
12.07 Identify basic project management systems.

13.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

13.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
13.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
13.03 Read and follow written and oral instructions.
13.04 Answer and ask questions coherently and concisely.
13.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
13.06 Demonstrate appropriate telephone/communication skills.

14.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

14.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

14.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

14.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

14.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

14.05 Demonstrate an understanding of federal, state and local taxes and their computation.

15.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

15.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

15.02 Draw conclusions or make inferences from data.

15.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

15.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.

16.02 Secure information about a job.

16.03 Identify documents which may be required when applying for a job interview.

16.04 Complete a job application form correctly.

16.05 Demonstrate competence in job interview techniques.

16.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

16.07 Identify acceptable work habits.

16.08 Demonstrate knowledge of how to make job changes appropriately.

16.09 Demonstrate acceptable employee health habits.

16.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define entrepreneurship.

17.02 Describe the importance of entrepreneurship to the American economy.

17.03 List the advantages and disadvantages of business ownership.

17.04 Identify the risks involved in ownership of a business.

17.05 Identify the necessary personal characteristics of a successful entrepreneur.

17.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Automotive Body Repair and Refinishing
Occupational Area:	Industrial
	Secondary
Program Numbers	**8709000**
CIP Number	0647.060303
Grade Level	9-12, 30, 31
Length	6 credits
Certification	AUTO IND @7G
	AUTO BODY @7G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as automotive body, related repairers (85305639), automobile body repairers (807.381-010). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content will include the following: basic trade skills; refinishing skills; sheetmetal repair skills; related welding skills; use of plastic fillers; paint systems and undercoats; and minor miscellaneous repairs. The course content should also include skills training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

Listed below are the courses that comprise this program when offered at the secondary level:

8709010 Automotive Body Repair and Refinishing 1
8709020 Automotive Body Repair and Refinishing 2
8709030 Automotive Body Repair and Refinishing 3
8709040 Automotive Body Repair and Refinishing 4
8709050 Automotive Body Repair and Refinishing 5
8709060 Automotive Body Repair and Refinishing 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: use of hand and power tools; panel repairs; use of frame measurement equipment; application of fillers; paint systems; use of shop materials; glass replacement; and use of MIG, oxyacetylene and plastic welders.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills required for this postsecondary adult vocational program is: Mathematics 7.0, Language 7.0 and Reading 8.0. This grade level number corresponds to a grade level equivalent score obtained on a state designated basic skills examination.

When this program is offered at the postsecondary level it may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with section 230.643, F.S.

This program serves as the Florida automotive collision repair common core program and its content is compatible with and a prerequisite for advanced skills contained in the PSAV program, Automotive Body Repair and Refinishing.

The average length of this program for the typical student is 900 hours.

IV. **INTENDED OUTCOMES**--The student will be able to:

01.0 Demonstrate shop and occupational safety skills
02.0 Prepare vehicles for repair and refinishing.
03.0 Repair, replace and adjust outer body panels.
04.0 Prepare parts and panels for metal finishing.
05.0 Prepare and apply body fillers.
06.0 Perform welding operations.
07.0 Setup vehicle for pulling and measuring.
08.0 Prepare surfaces for refinishing.
09.0 Maintain and operate spray equipment.
10.0 Select and apply appropriate paints and finishes.
11.0 Perform miscellaneous repairs.
12.0 Demonstrate appropriate communication skills.
13.0 Demonstrate appropriate math skills.
14.0 Demonstrate appropriate understanding of basic science.
15.0 Demonstrate employability skills.
16.0 Demonstrate an understanding of entrepreneurship.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Automotive Body Repair and Refinishing
Secondary Number: 8709000
Postsecondary Number:

01.0 **DEMONSTRATE SHOP AND OCCUPATIONAL SAFETY SKILLS**--The student will be able to:

- 01.01 Comply with safety rules regarding chemicals.
- 01.02 Comply with safety rules regarding personal clothing and devices.
- 01.03 Comply with safety rules regarding hand tools and power equipment.
- 01.04 Comply with shop safety rules and regulations.
- 01.05 Identify sources of air borne contamination and other hazards; take necessary steps to protect the health of the painter and other personnel.
- 01.06 Inspect air makeup and exhaust systems (including intake filters, exhaust filters, fans and other mechanical components of the system) to insure proper filtering and ventilation.
- 01.07 Identify career opportunities in auto body repair.
- 01.08 Explain requirements for continuing education in auto body repair.

02.0 **PREPARE VEHICLES FOR REPAIR AND REFINISHING**--The student will be able to:

- 02.01 Remove damaged outside trim and moldings.
- 02.02 Remove damaged or necessary inside trim and moldings.
- 02.03 Remove damaged, nonstructural body panels and components that may interfere with, or be damaged during repair.
- 02.04 Protect panels and parts adjacent to repair areas to prevent damage.
- 02.05 Remove dirt, corrosion, undercoatings, sealers and/or other protective coatings necessary to perform repairs to structural areas.
- 02.06 Remove repairable plastics and other parts that are recommended for off car repair.
- 02.07 Store reusable parts and fasteners removed from vehicle.

03.0 **REPAIR, REPLACE, AND ADJUST OUTER BODY PANELS**--The student will be able to:

- 03.01 Remove and replace a bolted panel or panel assembly.
- 03.02 Remove and replace hoods, hood hinges and hood latches.
- 03.03 Remove and replace deck lids, lid hinges and lid latches.
- 03.04 Remove and replace doors, tailgates, hatches, lift gates and hinges.

03.05 Remove and replace bumpers, reinforcements, guards, isolators, and mounting hardware (release pressure from gas- and oil filled energy-absorbing-type bumper isolators that are being discarded).
03.06 Check and adjust hood clearances to adjoining panels.
03.07 Check and adjust deck lid, lift gate and hatch clearances to adjoining panels.
03.08 Check door hinge condition; check door frames for square, check and adjust door clearances (where adjustable) along quarter panels, doors, rocker panels, fenders and tops.
03.09 Check and adjust latch assemblies on all hinged components.
03.10 Check and adjust bumper clearances to adjacent body and filler panels.
03.11 Straighten roughed out contours of damaged panels to a surface condition for body filling or metal finishing.
03.12 Weld cracked or torn steel body panels,; reweld broken welds.
03.13 Cold shrink stretched panel areas back to contour.
03.14 Restore protective coatings and sealants.

04.0 **PREPARE PARTS AND PANELS FOR METAL FINISHING**--The student will be able to:

04.01 Identify specification(s) of metals used in automobiles.
04.02 Identify heat effects on metals.
04.03 Identify the importance of maintaining the structural integrity of an auto body.
04.04 Grind the paint from the damaged area of a body panel.
04.05 Pick and file the damaged area of a body panel to eliminate surface irregularities.
04.06 Disc sand the repaired body panel to produce final smoothness.

05.0 **PREPARE AND APPLY BODY FILLERS**--The student will be able to:

05.01 Mix filler.
05.02 Apply body filler and cheese grate during curing.
05.03 Rough sand cured body filler to contour and then finish sand.

06.0 **PERFORM WELDING OPERATIONS**--The student will be able to:

06.01 Setup, operate and maintain metal inert gas (MIG) welding equipment.
06.02 Perform various welds with MIG equipment including plug, butt, and lap.
06.03 Setup, operate, and maintain oxycetaline welding equipment.
06.04 Perform various welding, cutting, and heating techniques with oxyacetylene equipment.

07.0 **SETUP VEHICLE FOR MEASURING AND PULLING**--The student will be able to:

07.01 Plan methods and order of repair.
07.02 Mount vehicle on anchoring equipment.
07.03 Measure vehicle damage.
07.04 Attach pulling equipment.

08.0 **PREPARE SURFACES FOR REFINISHING**--The student will be able to:

08.01 Inspect and identify types of finishes and surface conditions and develop a plan for refinishing.
08.02 Remove and store trim and molding.
08.03 Remove dirt, wax, and road grime from areas to be refinished and from adjacent surfaces.
08.04 Mask trim and other areas that will not be refinished.
08.05 Remove paint finishes (chemically or mechanically).
08.06 Dry or wet sand areas to be refinished.
08.07 Featheredge broken areas to be refinished.
08.08 Identify types of metals and apply suitable metal treatments.
08.09 Mix primer, primer surfacer or primer sealer and spray onto the surface of repaired areas.
08.10 Apply glazing putty to pinholes, scratches, and other minor surface imperfections.
08.11 Dry- or wet sand areas to which primer surfacer and glazing putty have been applied.
08.12 Compound around the edges of repaired areas to be refinished.
08.13 Blow dust from areas to be refinished including cracks or moldings of adjacent areas.
08.14 Clean area to be refinished with a proper solvent.
08.15 Remove, with a tack rag, any dust or lint particles from the areas to be refinished.
08.16 Apply suitable sealers to the areas being refinished when sealing is needed or desirable.
08.17 Identify and correct finish defects.

09.0 **MAINTAIN AND OPERATE SPRAY EQUIPMENT**--The student will be able to:

09.01 Check and adjust air pressure at the spray gun.
09.02 Adjust spray gun fluid and pattern control valves.
09.03 Use appropriate spray techniques (gun arc, gun angle, gun distance, gun speed, and spray pattern overlap) for the finish being applied.
09.04 Inspect, clean, and determine the condition and adequacy of spray guns and related equipment (air hoses, regulators, air lines, and compressors).

10.0 **SELECT AND APPLY APPROPRIATE PAINTS AND FINISHES**--The student will be able to:

10.01 Select the proper spray mask, inspect the spray mask to insure proper fit and operation, and inspect the condition of the mask filters and other components.

10.02 Determine the type and color of paint already on a vehicle.
10.03 Shake, stir, thin or reduce, and strain paint.
10.04 Apply acrylic enamel for spot repairs.
10.05 Apply acrylic enamel for panel repairs.
10.06 Apply acrylic enamel for overall refinishing.
10.07 Apply acrylic lacquer for spot repairs.
10.08 Apply acrylic lacquer for panel repairs.
10.09 Check for color matching of all applied materials.
10.10 Sand, buff, and polish finishes where necessary.
10.11 Identify the types of plastic parts to be finished and determine the proper refinishing procedure.
10.12 Apply a finish coat to plastic parts.
10.13 Clean, condition, and refinish vinyl (e.g. upholstery, dashes, and tops).
10.14 Clean and detail a vehicle after completion of refinishing.
10.15 Apply stone chip resistant coatings to lower body areas.
10.16 Restore corrosion resistant coatings, caulking, and seam sealers to repaired areas.
10.17 Identify and correct paint application problems.

11.0 **PERFORM MISCELLANEOUS REPAIRS**--The student will be able to:

11.01 Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanisms, and related controls.
11.02 Diagnose and repair water leaks, dust leaks, and wind noises.
11.03 Inspect, repair or replace weather stripping.
11.04 Inspect, remove, and replace all stationary glass (including windshields, back lights, etc.) using manufacturers' recommended installation materials and procedures.
11.05 Repair damaged circuits and wires.
11.06 Align headlamps.
11.07 Apply rust repair methods including grinding, sandblasting, and metal preparation.

12.0 **DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS**--The student will be able to:

12.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
12.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
12.03 Read and follow written and oral instructions.
12.04 Answer and ask questions coherently and concisely.
12.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
12.06 Demonstrate appropriate telephone/communication skills.

13.0 **DEMONSTRATE APPROPRIATE MATH SKILLS**--The student will be able to:

13.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

13.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

13.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

13.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

13.05 Demonstrate an understanding of federal, state and local taxes and their computation.

14.0 **DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE**--The student will be able to:

14.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

14.02 Draw conclusions or make inferences from data.

14.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

14.04 Understand pressure measurement in terms of P.S.I., inches of mercury and K.P.A.

15.0 **DEMONSTRATE EMPLOYABILITY SKILLS**--The student will be able to:

15.01 Conduct a job search.

15.02 Secure information about a job.

15.03 Identify documents that may be required when applying for a job.

15.04 Complete a job application form correctly.

15.05 Demonstrate competence in job interview techniques.

15.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.

15.07 Identify acceptable work habits.

15.08 Demonstrate knowledge of how to make job changes appropriately.

15.09 Demonstrate acceptable employee health habits.

15.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

16.0 **DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP**--The student will be able to:

16.01 Define entrepreneurship.

16.02 Describe the importance of entrepreneurship to the American economy.

16.03 List the advantages and disadvantages of business ownership.

16.04 Identify the risks involved in ownership of a business.

16.05 Identify the necessary personal characteristics of a successful entrepreneur.

16.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8709010
Course Title: Automotive Body Repair and Refinishing 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for demonstrating shop and occupational safety skills and employability skills, and comprehending and complying with requirements concerning legal liability and consequent insurance implications.

01.0 **DEMONSTRATE SHOP AND OCCUPATIONAL SAFETY SKILLS**--The student will be able to:

- 01.01 Comply with safety rules regarding chemicals.
- 01.02 Comply with safety rules regarding personal clothing and devices.
- 01.03 Comply with safety rules regarding hand tools and power equipment.
- 01.04 Comply with shop safety rules and regulations.
- 01.05 Identify sources of air borne contamination and other hazards; take necessary steps to protect the health of the painter and other personnel.
- 01.06 Inspect air makeup and exhaust systems (including intake filters, exhaust filters, fans and other mechanical components of the system) to insure proper filtering and ventilation.
- 01.07 Identify career opportunities in auto body repair.
- 01.08 Explain requirements for continuing education in auto body repair.

14.0 **DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE**--The student will be able to:

- 14.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 14.02 Draw conclusions or make inferences from data.
- 14.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 14.04 Understand pressure measurement in terms of P.S.I., inches of mercury and K.P.A.

15.0 **DEMONSTRATE EMPLOYABILITY SKILLS**--The student will be able to:

- 15.01 Conduct a job search.
- 15.02 Secure information about a job.
- 15.03 Identify documents that may be required when applying for a job.

15.04 Complete a job application form correctly.
15.05 Demonstrate competence in job interview techniques.
15.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
15.07 Identify acceptable work habits.
15.08 Demonstrate knowledge of how to make job changes appropriately.
15.09 Demonstrate acceptable employee health habits.
15.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8709020
Course Title: Automotive Body Repair and Refinishing 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for preparing vehicles for repair and refinishing and repair, replacement and adjustment of outer body panels.

02.0 **PREPARE VEHICLES FOR REPAIR AND REFINISHING**--The student will be able to:

- 02.01 Remove damaged outside trim and moldings.
- 02.02 Remove damaged or necessary inside trim and moldings.
- 02.03 Remove damaged, nonstructural body panels and components that may interfere with, or be damaged during, repair.
- 02.04 Protect panels and parts adjacent to repair areas to prevent damage.
- 02.05 Remove dirt, corrosion, undercoatings, sealers and/or other protective coatings necessary to perform repairs to structural areas.
- 02.06 Remove repairable plastics and other parts that are recommended for off car repair.
- 02.07 Store reusable parts and fasteners removed from vehicle.

03.0 **REPAIR, REPLACE, AND ADJUST OUTER BODY PANELS**--The student will be able to:

- 03.01 Remove and replace a bolted panel or panel assembly.
- 03.02 Remove and replace hoods, hood hinges and hood latches.
- 03.03 Remove and replace deck lids, lid hinges and lid latches.
- 03.04 Remove and replace doors, tailgates, hatches, lift gates and hinges.
- 03.05 Remove and replace bumpers, reinforcements, guards, isolators, and mounting hardware (release pressure from gas- and oil filled energy-absorbing-type bumper isolators that are being discarded).
- 03.06 Check and adjust hood clearances to adjoining panels.
- 03.07 Check and adjust deck lid, lift gate and hatch clearances to adjoining panels.
- 03.08 Check door hinge condition; check door frames for square, check and adjust door clearances (where adjustable) along quarter panels, doors, rocker panels, fenders and tops.
- 03.09 Check and adjust latch assemblies on all hinged components.
- 03.10 Check and adjust bumper clearances to adjacent body and filler panels.
- 03.11 Straighten roughed out contours of damaged panels to a surface condition for body filling or metal finishing.

03.12 Weld cracked or torn steel body panels,; reweld broken welds.

03.13 Cold shrink stretched panel areas back to contour.

03.14 Restore protective coatings and sealants.

13.0 **DEMONSTRATE APPROPRIATE MATH SKILLS**--The student will be able to:

13.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

13.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

13.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

13.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

13.05 Demonstrate an understanding of federal, state and local taxes and their computation.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8709030
Course Title: Automotive Body Repair and Refinishing 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for preparing parts and panels for metal finishing, applying body fillers, and performing welding operations.

04.0 **PREPARE PARTS AND PANELS FOR METAL FINISHING**--The student will be able to:

- 04.01 Identify specification(s) of metals used in automobiles.
- 04.02 Identify heat effects on metals.
- 04.03 Identify the importance of maintaining the structural integrity of an auto body.
- 04.04 Grind the paint from the damaged area of a body panel.
- 04.05 Pick and file the damaged area of a body panel to eliminate surface irregularities.
- 04.06 Disc sand the repaired body panel to produce final smoothness.

05.0 **PREPARE AND APPLY BODY FILLERS**--The student will be able to:

- 05.01 Mix filler.
- 05.02 Apply body filler and cheese grate during curing.
- 05.03 Rough sand cured body filler to contour and then finish sand.

06.0 **PERFORM WELDING OPERATIONS**--The student will be able to:

- 06.01 Setup, operate and maintain metal inert gas (MIG) welding equipment.
- 06.02 Perform various welds with MIG equipment including plug, butt, and lap.
- 06.03 Setup, operate, and maintain oxyacetylene welding equipment.
- 06.04 Perform various welding, cutting, and heating techniques with oxyacetylene equipment.

12.0 **DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS**--The student will be able to:

- 12.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 12.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 12.03 Read and follow written and oral instructions.

12.04 Answer and ask questions coherently and concisely.
12.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
12.06 Demonstrate appropriate telephone/communication skills.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8709040
Course Title: Automotive Body Repair and Refinishing 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for setting up vehicle for measuring and pulling and for preparing surfaces for refinishing.

07.0 **SETUP VEHICLE FOR MEASURING AND PULLING**--The student will be able to:

- 07.01 Plan methods and order of repair.
- 07.02 Mount vehicle on anchoring equipment.
- 07.03 Measure vehicle damage.
- 07.04 Attach pulling equipment.

08.0 **PREPARE SURFACES FOR REFINISHING**--The student will be able to:

- 08.01 Inspect and identify types of finishes and surface conditions and develop a plan for refinishing.
- 08.02 Remove and store trim and molding.
- 08.03 Remove dirt, wax, and road grime from areas to be refinished and from adjacent surfaces.
- 08.04 Mask trim and other areas that will not be refinished.
- 08.05 Remove paint finishes (chemically or mechanically).
- 08.06 Dry- or wet sand areas to be refinished.
- 08.07 Featheredge broken areas to be refinished.
- 08.08 Identify types of metals and apply suitable metal treatments.
- 08.09 Mix primer, primer surfacer or primer sealer and spray onto the surface of repaired areas.
- 08.10 Apply glazing putty to pinholes, scratches, and other minor surface imperfections.
- 08.11 Dry or wet sand areas to which primer surfacer and glazing putty have been applied.
- 08.12 Compound around the edges of repaired areas to be refinished.
- 08.13 Blow dust from areas to be refinished including cracks or moldings of adjacent areas.
- 08.14 Clean area to be refinished with a proper solvent.
- 08.15 Remove, with a tack rag, any dust or lint particles from the areas to be refinished.
- 08.16 Apply suitable sealers to the areas being refinished when sealing is needed or desirable.
- 08.17 Identify and correct finish defects.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8709050
Course Title: Automotive Body Repair and Refinishing 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for maintaining and operating spray equipment, selecting and applying appropriate paints and finishes and diagnosing and correcting paint application problems.

09.0 **MAINTAIN AND OPERATE SPRAY EQUIPMENT**--The student will be able to:

- 09.01 Check and adjust air pressure at the spray gun.
- 09.02 Adjust spray gun fluid and pattern control valves.
- 09.03 Use appropriate spray techniques (gun arc, gun angle, gun distance, gun speed, and spray pattern overlap) for the finish being applied.
- 09.04 Inspect, clean, and determine the condition and adequacy of spray guns and related equipment (air hoses, regulators, air lines, and compressors).

10.0 **SELECT AND APPLY APPROPRIATE PAINTS AND FINISHES**--The student will be able to:

- 10.01 Select the proper spray mask, inspect the spray mask to insure proper fit and operation, and inspect the condition of the mask filters and other components.
- 10.02 Determine the type and color of paint already on a vehicle.
- 10.03 Shake, stir, thin or reduce, and strain paint.
- 10.04 Apply acrylic enamel for spot repairs.
- 10.05 Apply acrylic enamel for panel repairs.
- 10.06 Apply acrylic enamel for overall refinishing.
- 10.07 Apply acrylic lacquer for spot repairs.
- 10.08 Apply acrylic lacquer for panel repairs.
- 10.09 Check for color matching of all applied materials.
- 10.10 Sand, buff, and polish finishes where necessary.
- 10.11 Identify the types of plastic parts to be finished and determine the proper refinishing procedure.
- 10.12 Apply a finish coat to plastic parts.
- 10.13 Clean, condition, and refinish vinyl (e.g. upholstery, dashes, and tops).
- 10.14 Clean and detail a vehicle after completion of refinishing.
- 10.15 Apply stone chip resistant coatirgs to lower body areas.
- 10.16 Restore corrosion resistant coatings, caulking, and seam sealers to repaired areas.
- 10.17 Identify and correct paint application problems.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8709060
Course Title: Automotive Body Repair and Refinishing 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for performing miscellaneous repairs.

11.0 **PERFORM MISCELLANEOUS REPAIRS**--The student will be able to:

- 11.01 Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanisms, and related controls.
- 11.02 Diagnose and repair water leaks, dust leaks, and wind noises.
- 11.03 Inspect, repair or replace weather stripping.
- 11.04 Inspect, remove, and replace all stationary glass (including windshields, back lights, etc.) using manufacturers' recommended installation materials and procedures.
- 11.05 Repair damaged circuits and wires.
- 11.06 Align headlamps.
- 11.07 Apply rust repair methods including grinding, sandblasting, and metal preparation.

16.0 **DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP**--The student will be able o:

- 16.01 Define entrepreneurship.
- 16.02 Describe the importance of entrepreneurship to the American economy.
- 16.03 List the advantages and disadvantages of business ownership.
- 16.04 Identify the risks involved in ownership of a business.
- 16.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 16.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Automotive Collision Repair and Refinishing
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I470603**
CIP Number	0647.060300
Grade Level	30, 31
Length	1800 hours
Certification	AUTO IND @7 G
	AUTO BODY @7 G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as automotive body, related repairers (85305639), automobile body repairers (807.381-010). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content will include the following: basic trade skills; refinishing skills; sheetmetal repair skills; frame and unibody squaring and aligning; use of fillers; paint systems and undercoats; related welding skills; related mechanical skills; trim-hardware maintenance; glass servicing; and other miscellaneous repairs. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: use of hand and power tools; panel repairs; use of spray equipment; use of frame and alignment equipment; application of body fillers; paint systems; use of shop materials; glass replacement; and use of MIG, oxyacetylene and plastic welders.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for

each student: a training plan which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 7.0, Language 7.0, Reading 8.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other. Students who have mastered competencies, included in the Automotive Body Repair and Refinishing, should not be required to repeat those competencies.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1800 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate vehicle and industry knowledge, business management and shop and occupational safety skills.
02.0 Prepare vehicles for repair and refinishing.
03.0 Repair, replace and adjust outer body panels.
04.0 Prepare parts and panels for metal finishing.
05.0 Prepare and apply body fillers.
06.0 Perform welding operations.
07.0 Setup vehicle for measuring and pulling.
08.0 Prepare surfaces for refinishing.
09.0 Maintain and operate spray equipment.
10.0 Select and apply appropriate paints and finishes.
11.0 Finish defects, causes and cures.
12.0 Perform miscellaneous repairs.
13.0 Repair fiberglass and plastic components.
14.0 Inspect, measure, and repair unibody vehicles.
15.0 Inspect and repair frame type vehicle bodies.
16.0 Demonstrate appropriate communication skills.
17.0 Demonstrate appropriate math skills.
18.0 Demonstrate appropriate understanding of basic math.
19.0 Demonstrate employability skills.
20.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Automotive Collision Repair And Refinishing
Secondary Number:
Postsecondary Number: I470603

01.0 DEMONSTRATE VEHICLE AND INDUSTRY KNOWLEDGE, BUSINESS MANAGEMENT AND SHOP AND OCCUPATIONAL SAFETY SKILLS--The student will be able to:

01.01 Comply with safety rules established by OSHA, NIOSH, EPA, and DER regarding chemicals and hazardous materials.
01.02 Comply with safety rules established by OSHA and NIOSH regarding personal clothing and devices.
01.03 Comply with safety rules regarding hand tools and power equipment and use them properly, including fire extinguishers.
01.04 Comply with locally developed shop safety rules and regulations.
01.05 Identify sources of airborne contamination and other hazards.
01.06 Inspect air makeup and exhaust systems (including intake filters, exhaust filters, fans and other mechanical components of the system) to insure proper filtering and ventilation.
01.07 Select proper spray mask; inspect the spray mask to insure proper fit and operation; inspect the condition of the mask filters and other components.
01.08 Explain the "Right to Know Law" as applicable to auto body repair occupations.
01.09 Identify vehicle parts by name, location and function.
01.10 Read and explain damage reports.
01.11 Operate basic office machines.
01.12 Demonstrate basic keyboarding skills and computer usage.
01.13 Perform structural damage analysis and determine repair procedures.
01.14 Determine acceptable parts to use: new, used or aftermarket.
01.15 Prepare damage reports manually to industry standards.
01.16 Prepare damage reports to industry standards using a computer.

02.0 PREPARE VEHICLES FOR REPAIR AND REFINISHING--The student will be able to:

02.01 Use specification and crash manuals including "P" pages.
02.02 Diagnose and analyze damage to determine appropriate methods for overall repair.
02.03 Remove, replace and align damaged outside trim and moldings.
02.04 Remove, replace and align damaged or necessary inside trim and moldings.
02.05 Remove, replace and align damaged, non-structural body panels and components that may interfere with or be damaged during repair.
02.06 Protect panels and parts adjacent to repair area to prevent damage.
02.07 Remove dirt, grease and wax from those areas to be repaired.

02.08 Remove dirt, corrosion, under coatings, sealers, and/or other protective coatings necessary to perform repairs to structural areas.

02.09 Remove, replace, and align repairable plastics and other parts that are recommended for off-car repair.

02.10 Locate, read, and interpret automobile manufacturers' data plates.

02.11 Locate, remove and replace to specifications, those vehicle electrical/electronic devices that might be damaged during repair.

02.12 Explain proper air bag operation and passive restraint handling.

03.0 REPAIR, REPLACE, AND ADJUST OUTER BODY PANELS--The student will be able to:

03.01 Remove, replace, and adjust a bolted panel or panel assembly.

03.02 Remove, replace, and align a welded (non-structural) steel panel or panel assembly.

03.03 Determine the extent of damage to structural body panels; repair, weld, or replace in accordance with manufacturers' specifications.

03.04 Remove, replace, and align hoods, hood hinges and hood latches.

03.05 Remove, replace, and align deck lids, lid hinges and lid latches.

03.06 Remove, replace, and align doors, tailgates, hatches, lift gates and hinges.

03.07 Remove and replace bumpers, reinforcements, guards, isolators, and mounting hardware (release pressure from gas- and oil-filled energy-absorbing-type bumper isolators that are being discarded).

03.08 Check door hinge condition; replace hinge pins and bushings as needed, check door frames, check and adjust door clearances (where adjustable) along quarter panels, doors, rocker panels, fenders and tops.

03.09 Check and adjust latch assemblies on all hinged components.

03.10 Straighten roughed out contours of damaged panels to a surface condition for body filling or metal finishing.

03.11 Weld cracked or torn steel body panels,; reweld broken welds.

03.12 Apply protective coatings and sealants to structural panels.

03.13 Heat shrink stretched panel areas back to contour.

03.14 Cold shrink stretched panel areas back to contour.

03.15 Repair or replace door skins and intrusion beams.

04.0 PREPARE PARTS AND PANELS FOR METAL FINISHING--The student will be able to:

04.01 Identify specification(s) of metals used in automobiles.

04.02 Identify heat effects on metals.

04.03 Identify the importance of maintaining the structural integrity of an vehicle body.

04.04 Remove the paint from the damaged area of a body panel.

04.05 Pick and file the damaged area of a body panel to eliminate surface irregularities.

04.06 . Disc sand the repaired body panel to produce final smoothness.

05.0 PREPARE AND APPLY BODY FILLERS--The student will be able to:

05.01 Mix plastic filler.
05.02 Apply plastic body filler and cheese grate during curing.
05.03 Block sand cured plastic body fillers to contour and then finish sand.
05.04 Describe the process of cleaning and tinning surfaces of body panels for solder filling and neutralizing.

06.0 PERFORM WELDING OPERATIONS--The student will be able to:

06.01 Demonstrate welding safety procedures.
06.02 Identify metal types prior to welding.
06.03 Setup, operate and maintain metal inert gas (MIG) welding equipment.
06.04 Perform various welds with MIG equipment including plug, butt, and lap.
06.05 Setup and maintain oxyacetylene welding equipment.
06.06 Explain various welding, cutting, and heating techniques with oxyacetylene equipment.
06.07 Describe plasma cutting.
06.08 Remove, replace, and align damaged, structural body panels and components that may interfere with or be damaged during repairing.
06.09 Weld aluminum.
06.10 Explain electric compression spot welding.
06.11 Setup, operate, and maintain Tungsten Inert Gas (TIG) welding equipment.
06.12 Set up and perform plasma cutting operations.

07.0 SETUP VEHICLE FOR MEASURING AND PULLING--The student will be able to:

07.01 Determine and plan methods and order of repair.
07.02 Mount vehicle on anchoring equipment.
07.03 Measure vehicle damage using manufacturers' specifications.
07.04 Attach pulling equipment, pull and re-measure.

08.0 PREPARE SURFACES FOR REFINISHING--The student will be able to:

08.01 Inspect and identify types of finishes and surface conditions and develop a plan for refinishing using one paint system from start to finish in conformance with paint system manufacturer specifications.
08.02 Gain access to, remove and store trim and molding.
08.03 Remove dirt, wax, and road grime from areas to be refinished and adjacent surfaces including complete washing of the vehicle.
08.04 Inspect and identify type of substrate, and surface condition; develop a plan for refinishing.
08.05 Chemically and mechanically remove paint finishes.
08.06 Dry and wet sand areas to be refinished.
08.07 Featheredge broken areas to be refinished.

08.08 Mask and protect other areas that will not be refinished.
08.09 Mix primer, primer surfacer or primer sealer and spray onto the surface of repaired areas including two components and self etching primers.
08.10 Apply glazing putty to minor surface imperfections.
08.11 Select proper abrasives and dry or wet sand area to which primer-surfacer and glazing putty have been applied.
08.12 Compound around the edges of repaired areas to be refinished.
08.13 Remove dust from areas to be refinished including cracks or moldings of adjacent areas.
08.14 Clean area to be refinished with a proper solution.
08.15 Remove, with a tack rag, any dust or lint particles from the areas to be refinished.
08.16 Determine when sealing is needed or desirable and apply suitable sealer to the area being refinished.
08.17 Scuff sand to remove nibs or overspray from a sealer.
08.18 Apply adhesion promoter over areas to be painted and blend into adjacent areas.
08.19 Apply stone chip resistant coating.
08.20 Restore corrosion resistant coatings, caulking and seam sealers to repaired areas.

09.0 MAINTAIN AND OPERATE SPRAY EQUIPMENT--The student will be able to:

09.01 Explain, adjust and use a variety of spray guns including siphon feed, pressure feed, gravity feed and HVLP.
09.02 Check and adjust air pressure at the spray gun.
09.03 Adjust spray gun fluid and pattern control valves.
09.04 Use appropriate spray techniques (gun arc, gun angle, gun distance, gun speed, and spray pattern overlap) for the finish being applied.
09.05 Inspect, clean, and determine the condition and adequacy of spray guns and related equipment (air hoses, regulators, air lines, air sources, and spray environment).
09.06 Maintain and properly use the spray booth.

10.0 SELECT AND APPLY APPROPRIATE PAINTS AND FINISHES--The student will be able to:

10.01 Select the proper spray mask, inspect the spray mask to insure proper fit and operation, and inspect the condition of the mask filters and other components.
10.02 Determine the type and color of paint already on a vehicle and identify alternates.
10.03 Measure, shake, stir, thin or reduce, and strain paint.
10.04 Verify color match before applying and adjust if needed.
10.05 Apply acrylic enamel for spot, panel and overall refinishing.
10.06 Sand, buff, and polish finishes.
10.07 Clean and detail a vehicle after completion of refinishing.
10.08 Apply urethane enamel for spot, panel and overall refinishing.
10.09 Apply urethane clear coat for spot, panel and overall repairs.
10.10 Apply decals, transfers, tapes, wood-grains, pinstripes (painted and taped), etc.
10.11 Properly dispose of hazardous waste.

10.12 Identify the types of plastic parts to be finished and determine the proper refinishing procedure.
10.13 Apply a finish coat to plastic parts.
10.14 Clean, condition and refinish vinyl (e.g upholstery, dashes and tops).
10.15 Apply a tri-coat paint system.
10.16 Identify and explain the characteristics of water-borne paint systems.

11.0 FINISH DEFECTS, CAUSES, AND CURES--The student will be able to:

11.01 Check for rust spots; determine the cause(s) and correct the condition.
11.02 Identify paint cracking (crowsfeet or line-checking, micro-checking, etc); correct the condition.
11.03 Identify poor adhesion; determine the cause(s) and correct the condition.
11.04 Identify blistering appearance in the paint surface; determine the cause(s), and correct the condition.
11.05 Identify water spotting on paint surface, correct the condition.
11.06 Identify finish damage caused by bird droppings, tree sap, and other natural causes, correct the condition.
11.07 Identify finish damage caused by airborne contaminants (acids, soot, and other industrial-related causes); correct the condition.
11.08 Identify die-back conditions (dulling of the paint film showing haziness and/or film distortion showing shrinking); correct the condition.
11.09 Identify chalking (oxidation); correct the condition.
11.10 Identify body filler bleed-through; correct the condition.
11.11 Identify pin-holing; correct the condition.

12.0 PERFORM MISCELLANEOUS REPAIRS--The student will be able to:

12.01 Align headlamps.
12.02 Apply rust repair methods including grinding, sandblasting, and metal preparation.
12.03 Remove and replace headliners, carpets, seats and other interior components and trim.
12.04 Inspect, repair or replace weather stripping.
12.05 Identify procedures to perform two- and four- wheel alignments.
12.06 Diagnose and repair water leaks, dust leaks and wind noises.
12.07 Inspect, remove and replace all stationary glass (including windshield, back lights, etc.) using manufacturers' recommended installation materials and procedures including electrically heated glass.
12.08 Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanism and related controls.
12.09 Repair/replace all power driven accessories and related controls.
12.10 Inspect, repair or replace and adjust removable manually operated or electrically operated roof panels, hinges, latches, guides, handles, retainers and controls of sun roof.

12.11 Inspect, repair and replace convertible tops and related mechanisms.
12.12 Remove and replace vinyl tops.
12.13 Diagnose and repair damaged circuits, wires and electrical components.
12.14 Remove, replace and cap off air conditioner components.
12.15 Evacuate, recycle and recharge air conditioning systems.
12.16 Identify procedures to remove and replace engines and mounts.
12.17 Identify procedures to remove and replace transmissions and mounts.
12.18 Identify procedures to remove and replace suspension parts.
12.19 Identify procedures to remove and replace brake parts.
12.20 Identify procedures to bleed brakes.
12.21 Identify procedures to remove and replace fuel system components.
12.22 Demonstrate an understanding of ABS braking systems.
12.23 Inspect, adjust or repair steering, suspension and power-train components that affect four-wheel alignment.

13.0 REPAIR FIBER GLASS AND PLASTIC COMPONENTS--The student will be able to:

13.01 Differentiate between fiberglass and sheet molded compound (SMC) to be repaired and the appropriate repair procedures (including plastic welding, chemical bonding and the use of structural adhesives).
13.02 Repair deep gouges and cracks in fiberglass panels and sheet molded compound (SMC).
13.03 Repair holes in fiberglass panels and SMC.
13.04 Repair fiberglass body panels and straighten/align panel supports.
13.05 Remove damaged areas from fiberglass panels and SMC and repair with partial panel installation.
13.06 Prepare the surfaces of and repair damage to, thermoplastic parts.
13.07 Prepare the surfaces of and repair damage to thermosetting-plastic parts.

14.0 INSPECT, MEASURE, AND REPAIR UNIBODY VEHICLES--The student will be able to:

14.01 Precisely measure unibody vehicles.
14.02 Diagnose and measure unibody damage using self centering and tram gauges.
14.03 Diagnose and measure unibody damage using a datum plane.
14.04 Determine the location of all suspension, steering and power-train component attaching point to the body.
14.05 Clean, prime and apply protective coat to repaired unibody structural areas.
14.06 Determine the extent of the direct and indirect damage and the direction of impact and plan the method and order of repair.
14.07 Precisely measure unibody vehicles, check and adjust suspension mount points that effect four-wheel alignment.
14.08 Diagnose and measure unibody damage using a dedicated (fixture) measuring system.

14.09 Diagnose and measure unibody damage using a universal measuring system or a laser.

14.10 Attach proper body anchoring devices.

14.11 Straighten and align cowl assemblies.

14.12 Straighten and align roof pillars and roof panels.

14.13 Straighten and align door posts, sills, floor pans and rocker panels.

14.14 Straighten and align quarter panels, wheel housing assemblies and rear body sections (including rail, suspension and power train panels).

14.15 Straighten/align front end sections (aprons, strut towers, upper/lower rails, steering, suspension and power train mounting points).

14.16 Recognize the limitations of applying heat to high strength steel structural components, use proper heat stress relief methods on high strength steel and weld in accordance with manufacturers' specifications.

14.17 Use proper cold stress relief methods.

14.18 Remove folds, curves, creases and dents using power tools and hand tools to restore damaged areas to proper contours and dimensions.

14.19 Determine the extent of damage to structural steel body panels and repair, weld or replace them in accordance with manufacturers' specifications.

14.20 Determine the extent of damage to structural aluminum body panels in accordance with manufacturers' specifications.

14.21 Cut out damaged sections of structural steel body panels and weld in new and/or used replacement in accordance with accepted industry standards.

14.22 Recheck panel contour and alignment after pulling and correct or adjust as necessary.

15.0 INSPECT AND REPAIR FRAME TYPE VEHICLE BODIES--The student will be able to:

15.01 Diagnose and measure frame damage using self centering and tram gauge.

15.02 Determine the extent of direct and indirect damage and the direction of impact and plan methods and order of repairs.

15.03 Clean, prime and protective coat repaired frame areas.

15.04 Straighten and align mash damage.

15.05 Straighten and align sag damage.

15.06 Straighten and align side sway damage.

15.07 Straighten and align twist damage.

15.08 Straighten and align kickup damage.

15.09 Straighten and align broadside damage.

15.10 Straighten and align diamond frame damage.

15.11 Remove and replace damaged frame horns, side rails, cross members and front or rear frame sections and weld cracks in frame members.

15.12 Repair, reinforce or replace weakened frame members in accordance with vehicle manufacturers; recommendations.

16.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

16.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
16.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
16.03 Read and follow written and oral instructions.
16.04 Answer and ask questions coherently and concisely.
16.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
16.06 Demonstrate appropriate telephone/communication skills.

17.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

17.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
17.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
17.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
17.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
17.05 Demonstrate an understanding of federal, state and local taxes and their computation.

18.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

18.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
18.02 Draw conclusions or make inferences from data.
18.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
18.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

19.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

19.01 Conduct a job search.
19.02 Secure information about a job.
19.03 Identify documents which may be required when applying for a job interview.
19.04 Complete a job application form correctly.
19.05 Demonstrate competence in job interview techniques.
19.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
19.07 Identify acceptable work habits.
19.08 Demonstrate knowledge of how to make appropriate job changes.
19.09 Demonstrate acceptable employee health habits.
19.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

20.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

20.01 Identify characteristics of the American enterprise system.
20.02 Define inflation and deflation.
20.03 Illustrate the basic economic questions facing any society.
20.04 Determine the results of a change in demand or a change in supply.
20.05 List factors which contribute to economic growth.
20.06 Identify characteristics of different types of business ownership.
20.07 Choose appropriate action in a situation requiring application of business ethics.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Automotive Detailing And Reconditioning
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	N/A

	Secondary	PSAV
Program Numbers	**8710000**	**I470623**
CIP Number	0647.060302	0647.060302
Grade Level	9-12, 30, 31	30, 31
Length	3 Credits	450 Hours
Certification	AUTO BODY @7 G	AUTO BODY @7 G
	AUTO IND @7 G	AUTO IND @7 G
	AUTO MECH @7 G	AUTO MECH @7 G
Facility Code	246	246
VSO	VICA	VICA
Coop Method	Yes	Yes
Apprenticeship	No	No

I. **PURPOSE**: The purpose of this program is to prepare students for employment as an automobile detailer, DOT 915.687-034, or to provide supplemental training for persons currently or previously employed in these occupations.

The content should include, but not be limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices.

Listed below are the courses that comprise this program when offered at the secondary level:

8710010 - Automotive Detailing 1
8710020 - Automotive Detailing 2
8710030 - Automotive Detailing 3

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive Detailing and Reconditioning industry; planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program and provide instruction in use of hand and power tools, interior and exterior cleaning of vehicles, fabric and vinyl repairs, cleaning and preservation of vehicle paint surfaces, and application of pinstripes and window tint.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational

skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FEC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

When a student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards which the student must master to earn credit must be specified in the student's Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills required for this postsecondary adult vocational program is: Mathematics 8.0, Language 8.0 and Reading 8.0. This grade level number corresponds to a grade level equivalent score obtained on a state designated basic skills examinations.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

When this program is offered at the postsecondary level it may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 450 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
AUTOMOBILE DETAILER - DOT 915.687-034

01.0 Demonstrate shop and occupational safety skills.
02.0 Demonstrate proficiency in washing a vehicle.
03.0 Perform vehicle interior cleaning.
04.0 Demonstrate proficiency in reconditioning vehicle paint surfaces.

05.0 Demonstrate proficiency in caring for vinyl tops.
06.0 Degrease and clean engine compartment.
07.0 Perform minor upholstery and vinyl repairs.
08.0 Demonstrate proficiency in applying vinyl pinstripes.
09.0 Demonstrate proficiency in applying window tint.
10.0 Demonstrate appropriate communication skills.
11.0 Demonstrate appropriate math skills
12.0 Demonstrate appropriate understanding of basic science.
13.0 Demonstrate employability skills.
14.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Automotive Detailing And Reconditioning
Secondary Number: 8710000
Postsecondary Number: I470623

OCCUPATIONAL COMPLETION POINT - DATA CODE A
AUTOMOBILE DETAILER - DOT 915.687-034

01.0 DEMONSTRATE SHOP AND OCCUPATIONAL SAFETY SKILLS--The student will be able to:

- 01.01 Apply shop safety rules and procedures.
- 01.02 Comply with safety rules regarding chemicals.
- 01.03 Comply with shop safety rules regarding hand tools and power equipment.
- 01.04 Apply fire safety rules and procedures.
- 01.05 Comply with EPA standards regarding use of and disposal of chemicals.

02.0 DEMONSTRATE PROFICIENCY IN WASHING A VEHICLE--The student will be able to:

- 02.01 Identify the proper supplies needed to wash a vehicle.
- 02.02 Identify the correct sequence of washing a vehicle.
- 02.03 Dry the vehicle.
- 02.04 Inspect the finished vehicle.

03.0 PERFORM VEHICLE INTERIOR CLEANING--The student will be able to:

- 03.01 Identify the proper supplies and chemicals needed to clean and protect a vehicle interior.
- 03.02 Vacuum a vehicle interior.
- 03.03 Shampoo and/or clean vehicle upholstery.
- 03.04 Apply fabric guard chemicals.
- 03.05 Apply vinyl dressing and preservative chemicals.
- 03.06 Apply fabric reconditioning dyes.
- 03.07 Apply vinyl dyes.

04.0 DEMONSTRATE PROFICIENCY IN RECONDITIONING VEHICLE PAINT SURFACES--The student will be able to:

- 04.01 Identify the proper supplies and chemicals needed to recondition vehicle paint surfaces.
- 04.02 Operate a power buffer.
- 04.03 Apply rubbing/buffing compound.
- 04.04 Remove heavy paint oxidation.
- 04.05 Apply polishing compounds.
- 04.06 Apply waxes, sealants, and polymers.
- 04.07 Apply touch-up paint.

05.0 DEMONSTRATE PROFICIENCY IN CARING FOR VINYL TOPS--The student will be able to:

05.01 Identify the proper supplies and chemicals needed to care for vehicle vinyl tops.
05.02 Apply vinyl top cleaners.
05.03 Apply vinyl top dyes.
05.04 Apply vinyl top dressings.

06.0 DEGREASE AND CLEAN VEHICLE ENGINE COMPARTMENT--The student will be able to:

06.01 Identify the proper supplies and chemicals needed to clean and recondition vehicle engine compartment.
06.02 Operate a high pressure washer.
06.03 Degrease engine and engine compartment.
06.04 Select and apply correct color engine paint.
06.05 Apply clear engine paint.
06.06 Inspect belts and hoses.

07.0 PERFORM MINOR UPHOLSTERY AND VINYL REPAIRS--The student will be able to:

07.01 Identify the supplies necessary to perform minor upholstery repair.
07.02 Repair fabric upholstery.
07.03 Repair vinyl seat upholstery.
07.04 Repair vinyl dashboards.

08.0 DEMONSTRATE PROFICIENCY IN APPLYING VINYL PINSTRIPES--The student will be able to:

08.01 Identify the supplies and materials necessary to pinstripe a vehicle.
08.02 Sketch a vehicle pinstripe layout.
08.03 Apply pinstripes to a vehicle.
08.04 Sketch a multi-color graphic design using vinyl material.
08.05 Apply a vinyl multi-color graphic design to a vehicle.

09.0 DEMONSTRATE PROFICIENCY IN APPLYING WINDOW TINT--The student will be able to:

09.01 Identify the supplies and materials necessary to apply window tint to a vehicle.
09.02 Comply with local and state regulations regarding application of window tint on motor vehicles.
09.03 Apply window tint on flat glass surfaces.
09.04 Apply window tint to curved glass surfaces.

10.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

10.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
10.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
10.03 Read and follow written and oral instructions.
10.04 Answer and ask questions coherently and concisely.
10.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
10.06 Demonstrate appropriate telephone/communication skills.

11.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

11.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
11.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
11.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
11.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
11.05 Demonstrate an understanding of federal, state and local taxes and their computation.

12.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

12.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
12.02 Draw conclusions or make inferences from data.
12.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
12.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

13.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

13.01 Identify career opportunities in Auto Detailing.
13.02 Conduct a job search.
13.03 Secure information about a job.
13.04 Identify documents that may be required when applying for a job.
13.05 Complete a job application form correctly.
13.06 Demonstrate competence in job interview techniques.
13.07 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
13.08 Identify acceptable work habits.
13.09 Demonstrate knowledge of how to make appropriate job changes.
13.10 Demonstrate acceptable employee health habits.

13.11 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

14.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

14.01 Define entrepreneurship.
14.02 Describe the importance of entrepreneurship to the American economy.
14.03 List the advantages and disadvantages of business ownership.
14.04 Identify the risks involved in ownership of a business.
14.05 Identify the necessary personal characteristics of a successful entrepreneur.
14.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8710010
Course Title: Automotive Detailing 1
Course Credit: 1

COURSE DESCRIPTION:

01.0 DEMONSTRATE SHOP AND OCCUPATIONAL SAFETY SKILLS--The student will be able to:

- 01.01 Apply shop safety rules and procedures.
- 01.02 Comply with safety rules regarding chemicals.
- 01.03 Comply with shop safety rules regarding hand tools and power equipment.
- 01.04 Apply fire safety rules and procedures.
- 01.05 Comply with EPA standards regarding use of and disposal of chemicals.

02.0 DEMONSTRATE PROFICIENCY IN WASHING A VEHICLE--The student will be able to:

- 02.01 Identify the proper supplies needed to wash a vehicle.
- 02.02 Identify the correct sequence of washing a vehicle.
- 02.03 Dry the vehicle.
- 02.04 Inspect the finished vehicle.

03.0 PERFORM VEHICLE INTERIOR CLEANING--The student will be able to:

- 03.01 Identify the proper supplies and chemicals needed to clean and protect a vehicle interior.
- 03.02 Vacuum a vehicle interior.
- 03.03 Shampoo and/or clean vehicle upholstery.
- 03.04 Apply fabric guard chemicals.
- 03.05 Apply vinyl dressing and preservative chemicals.
- 03.06 Apply fabric reconditioning dyes.
- 03.07 Apply vinyl dyes.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8710020
Course Title: Automotive Detailing 2
Course Credit: 1

COURSE DESCRIPTION:

04.0 DEMONSTRATE PROFICIENCY IN RECONDITIONING VEHICLE PAINT SURFACES--The student will be able to:

- 04.01 Identify the proper supplies and chemicals needed to recondition vehicle paint surfaces.
- 04.02 Operate a power buffer.
- 04.03 Apply rubbing/buffing compound.
- 04.04 Remove heavy paint oxidation.
- 04.05 Apply polishing compounds.
- 04.06 Apply waxes, sealants, and polymers.
- 04.07 Apply touch-up paint.

05.0 DEMONSTRATE PROFICIENCY IN CARING FOR VINYL TOPS--The student will be able to:

- 05.01 Identify the proper supplies and chemicals needed to care for vehicle vinyl tops.
- 05.02 Apply vinyl top cleaners.
- 05.03 Apply vinyl top dyes.
- 05.04 Apply vinyl top dressings.

06.0 DEGREASE AND CLEAN VEHICLE ENGINE COMPARTMENT--The student will be able to:

- 06.01 Identify the proper supplies and chemicals needed to clean and recondition vehicle engine compartment.
- 06.02 Operate a high pressure washer.
- 06.03 Degrease engine and engine compartment.
- 06.04 Select and apply correct color engine paint.
- 06.05 Apply clear engine paint.
- 06.06 Inspect belts and hoses.

07.0 PERFORM MINOR UPHOLSTERY AND VINYL REPAIRS--The student will be able to:

- 07.01 Identify the supplies necessary to perform minor upholstery repair.
- 07.02 Repair fabric upholstery.
- 07.03 Repair vinyl seat upholstery.
- 07.04 Repair vinyl dashboards.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8710030
Course Title: Automotive Detailing 3
Course Credit: 1

COURSE DESCRIPTION:

08.0 DEMONSTRATE PROFICIENCY IN APPLYING VINYL PINSTRIPES--The student will be able to:

- 08.01 Identify the supplies and materials necessary to pinstripe a vehicle.
- 08.02 Sketch a vehicle pinstripe layout.
- 08.03 Apply pinstripes to a vehicle.
- 08.04 Sketch a multi-color graphic design using vinyl material.
- 08.05 Apply a vinyl multi-color graphic design to a vehicle.

09.0 DEMONSTRATE PROFICIENCY IN APPLYING WINDOW TINT--The student will be able to:

- 09.01 Identify the supplies and materials necessary to apply window tint to a vehicle.
- 09.02 Comply with local and state regulations regarding application of window tint on motor vehicles.
- 09.03 Apply window tint on flat glass surfaces.
- 09.04 Apply window tint to curved glass surfaces.

10.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 10.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 10.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 10.03 Read and follow written and oral instructions.
- 10.04 Answer and ask questions coherently and concisely.
- 10.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 10.06 Demonstrate appropriate telephone/communication skills.

11.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 11.01 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
- 11.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 11.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

11.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

11.05 Demonstrate an understanding of federal, state and local taxes and their computation.

12.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

12.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

12.02 Draw conclusions or make inferences from data.

12.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

12.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

13.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

13.01 Identify career opportunities in Auto Detailing.

13.02 Conduct a job search.

13.03 Secure information about a job.

13.04 Identify documents that may be required when applying for a job.

13.05 Complete a job application form correctly.

13.06 Demonstrate competence in job interview techniques.

13.07 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.

13.08 Identify acceptable work habits.

13.09 Demonstrate knowledge of how to make appropriate job changes.

13.10 Demonstrate acceptable employee health habits.

13.11 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

14.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

14.01 Define entrepreneurship.

14.02 Describe the importance of entrepreneurship to the American economy.

14.03 List the advantages and disadvantages of business ownership.

14.04 Identify the risks involved in ownership of a business.

14.05 Identify the necessary personal characteristics of a successful entrepreneur.

14.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Automotive Machine Shop
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I480513**
CIP Number	0648.050301
Grade Level	30, 31
Length	1500 hours
Certification	AUTO MACH @7 G
	METAL WORK @7 G
	AUTO IND @7 G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as automotive machinists, DOT 600.280-034, or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, remanufacture of automotive engines to original factory specifications, make judgements on when to remachine or replace components, remachine components for engine rebuild, recognize metal fatigue, and manufacture unusual or special parts when necessary.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program and provide instruction in cleaning, inspecting, grinding, drilling, honing, and reassembling automotive parts with an emphasis on accuracy.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is an appropriate vocational student organization for providing leadership training experiences and reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional program.

The cooperative method of instruction is appropriate for this program. Whenever the cooperative method is offered, the following is required for each student: a training agreement, a training plan signed by the student, teacher and employer, including instructional objectives and a list of on-the-job and in-school learning experiences and a work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must be paid for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 10.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1500 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Explain the principles of power.
02.0 Identify and use precision and non-precision hand tools.
03.0 Explain proper cleaning methods.
04.0 Disassemble and inspect engines.
05.0 Clean automotive engine components.
06.0 Surface grind heads.
07.0 Machine finish complete head.
08.0 Machine connecting rods and main bearing caps for finish honing.
09.0 Remachine cylinder walls.
10.0 Service pistons.
11.0 Service brake drums, disc brake system, and shoes.
12.0 Perform magnaflux nondestructive testing.
13.0 Service crankshaft.
14.0 Service flywheels and clutches.
15.0 Operate engine lathe.
16.0 Operate milling machine.
17.0 Operate drill press.
18.0 Demonstrate appropriate communication skills.
19.0 Demonstrate appropriate math skills.
20.0 Demonstrate appropriate understanding of basic science.
21.0 Demonstrate employability skills.
22.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Automotive Machine Shop
Secondary Number:
Postsecondary Number: I480513

01.0 EXPLAIN THE PRINCIPLES OF POWER--The student will be able to:

- 01.01 Demonstrate understanding of internal combustion engines.
- 01.02 Demonstrate understanding of concepts of heat, pressure, and compression as they relate to the internal combustion engine.
- 01.03 Explain differences between two and four cycle engines.
- 01.04 Demonstrate understanding of shop safety procedures.

02.0 IDENTIFY AND USE PRECISION AND NON-PRECISION HAND TOOLS--The student will be able to:

- 02.01 Select and use personal safety equipment.
- 02.02 Select, use, and maintain taps, dies, hones, drills, and reamers.
- 02.03 Select, use, and maintain punches, saws, chisels, and files.
- 02.04 Select and use micrometers, calipers, dial indicators, depth gauges, boring gauges, and plastigage.

03.0 EXPLAIN PROPER CLEANING METHODS--The student will be able to:

- 03.01 Identify types of soils.
- 03.02 Demonstrate understanding of chemicals and processes used for cleaning, including emulsion, parts washers, and cola and hot tanks.
- 03.03 Explain glass bead cleaning.

04.0 DISASSEMBLE AND INSPECT ENGINES--The student will be able to:

- 04.01 Remove and disassemble cylinder heads.
- 04.02 Remove and disassemble crankshafts, camshafts, rods, and pistons.
- 04.03 Inspect all parts and compare to acceptable tolerances.

05.0 CLEAN AUTOMOTIVE ENGINE COMPONENTS--The student will be able to:

- 05.01 Perform hot tank block cleaning.
- 05.02 Perform hot tank head cleaning.
- 05.03 Perform hot tank crankshaft cleaning.
- 05.04 Perform hot tank camshaft cleaning.
- 05.05 Bead clean valves and head.
- 05.06 Explain and demonstrate appropriate safety behavior while performing hot tank cleaning.

06.0 SURFACE GRIND HEADS--The student will be able to:

- 06.01 Set up and operate grinder.

06.02 Dress grinder wheel.
06.03 Inspect and replace grinder wheel.
06.04 Inspect finished heads.

07.0 MACHINE FINISH COMPLETE HEAD--The student will be able to:

07.01 Set up I.D.L. Machining Center to replace valve guides and seats.
07.02 Machine guides to proper size.
07.03 Machine valve seats.
07.04 Replace valve seats.

08.0 MACHINE CONNECTING RODS AND MAIN BEARING CAPS FOR FINISH HONING--The student will be able to:

08.01 Mark all rods and caps.
08.02 Check for bends and cracks.
08.03 Straighten rods.
08.04 Grind caps with rod and cap grinder.
08.05 Hone all rods.
08.06 Hone main bearing surfaces.

09.0 REMACHINE CYLINDER WALLS--The student will be able to:

09.01 Inspect cylinder blocks for damage.
09.02 Repair damaged areas.
09.03 Measure all cylinder bores.
09.04 Machine cylinder bores.
09.05 Hone cylinder walls.
09.06 Resleeve cylinder walls.

10.0 SERVICE PISTONS--The student will be able to:

10.01 Clean and inspect pistons.
10.02 Resize ring grooves.
10.03 Expand pistons (peening and knurling).
10.04 Fit piston pins.

11.0 SERVICE BRAKE DRUMS, DISC BRAKE SYSTEM AND SHOES--The student will be able to:

11.01 Clean, inspect, and measure components to be machined.
11.02 Set up and operate brake machining center.

12.0 PERFORM MAGNAFLUX NON-DESTRUCTIVE TESTING--The student will be able to:

12.01 Demonstrate understanding of magnaflux testing theory.
12.02 Perform testing by magnetizing with contacts.
12.03 Perform testing by magnetizing with coil.
12.04 Perform testing by magnetizing with a yoke.

12.05 Perform dye penetrate test.
12.06 Maintain testing equipment.

13.0 SERVICE CRANKSHAFTS--The student will be able to:

13.01 Check shaft in place.
13.02 Check shaft out of engine.
13.03 Straighten crankshaft.
13.04 Grind crankshaft.

14.0 SERVICE FLYWHEELS AND CLUTCHES--The student will be able to:

14.01 Inspect flywheels and clutch plates for wear and fatigue.
14.02 Measure and grind flywheels and clutch plates.

15.0 OPERATE ENGINE LATHE--The student will be able to:

15.01 Perform turning operations.
15.02 Perform facing operations.
15.03 Perform boring operations.
15.04 Perform drilling operations.

16.0 OPERATE MILLING MACHINE--The student will be able to:

16.01 Perform face milling operations
16.02 Perform climb operations.
16.03 Perform conventional operations.
16.04 Perform end operations.

17.0 OPERATE DRILL PRESS--The student will be able to:

17.01 Sharpen drills.
17.02 Perform drilling operations in press.

18.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

18.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
18.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
18.03 Read and follow written and oral instructions.
18.04 Answer and ask questions coherently and concisely.
18.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
18.06 Demonstrate appropriate telephone/communication skills.

19.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

19.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
19.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
19.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
19.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

19.05 Demonstrate an understanding of federal, state and local taxes and their computation.

20.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

20.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
20.02 Draw conclusions or make inferences from data.
20.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
20.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

21.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

21.01 Conduct a job search.
21.02 Secure information about a job.
21.03 Identify documents which may be required when applying for a job interview.
21.04 Complete a job application form correctly.
21.05 Demonstrate competence in job interview techniques.
21.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
21.07 Identify acceptable work habits.
21.08 Demonstrate knowledge of how to make appropriate job changes.
21.09 Demonstrate acceptable employee health habits.
21.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

22.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

22.01 Define entrepreneurship.
22.02 Describe the importance of entrepreneurship to the American economy.
22.03 List the advantages and disadvantages of business ownership.
22.04 Identify the risks involved in ownership of a business.
22.05 Identify the necessary personal characteristics of a successful entrepreneur.
22.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Automotive Service Management Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.080300
Grade Level	College Credits
Length	AS Degree

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as automotive service supervisors. This program also provides supplemental training for persons previously or currently employed in these occupations.

The course content will include the following: instruction in diagnosis of malfunctions in the repair of engines, fuel, electrical, cooling and brake systems; drive train and suspension systems; radiators; transmissions and carburetors; basic management concepts; troubleshooting skills; and servicing, maintaining and repairing all mechanical systems or gasoline and diesel powered automobiles including fuel, electrical, cooling, brake, drive, suspension and related systems.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive Service industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: engine system performance; automotive accessories; and theory, fundamentals, service and rebuilding of engines, automatic and manual transmissions, drive trains, steering, suspension, brake and electrical systems.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and

employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

Student performance standards required for National Institute for Automotive Service Excellence (ASE) certification are identified with the initials ASE following the standard.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate an understanding of automotive mechanics.
02.0 Apply electrical and electronic skills in diagnosing/troubleshooting malfunctions of electrical/electronic components.
03.0 Demonstrate proficiency in servicing steering, suspension and wheel systems.
04.0 Demonstrate proficiency in servicing automotive brake systems.
05.0 Demonstrate proficiency in servicing cooling, air conditioning and heating services.
06.0 Demonstrate proficiency in engine performance service.
07.0 Demonstrate proficiency in automatic transmission/trans-axle service.
08.0 Demonstrate proficiency in servicing manual drive trains and axles.
09.0 Demonstrate proficiency in engine repair service.
10.0 Demonstrate proficiency in management skills.
11.0 Demonstrate appropriate communication skills.
12.0 Demonstrate appropriate math skills.
13.0 Demonstrate appropriate understanding of basic science.
14.0 Demonstrate employability skills.
15.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Automotive Service Management Technology
Secondary Number:
Postsecondary Number: 0615.080300

01.0 DEMONSTRATE AN UNDERSTANDING OF AUTOMOTIVE MECHANICS--The student will be able to:

01.01 Apply shop safety rules and procedures.
01.02 Use and maintain hand tools such as screwdrivers,special application pliers, hammers, chisels, punches, special application wrenches and sockets, files, hacksaws, bench vises and "C" clamps.
01.03 Demonstrate use of precision measuring tools.
01.04 Use and install fasteners such as screws and bolts, key screw extractors, helicoil inserts and thread cutting taps and dies.
01.05 Use and maintain power tools such as drills, bench grinders, drill press, hydraulic presses, impact wrenches, air chisels, parts washers, hydraulic jacks and vehicle hoists.
01.06 Apply basic math skills.
01.07 Use and apply metric and English measurement skills.
01.08 Demonstrate an understanding of lubrication requirements.
01.09 Inspect, remove, replace and adjust all belts.
01.10 Perform auto safety inspection.
01.11 Demonstrate use of technical manuals, specification handbooks and charts.
01.12 Demonstrate an understanding of steering geometry and suspension geometry such as caster, camber, toe-in, king pin inclination (steering axis) and toe-in and toe-out on turns.
01.13 Demonstrate an understanding of the function of steering and suspension system components such as coil springs, leaf springs, torsion bars, twin "I" beams, quadralink, rubber bushings, shock absorbers, tie rods, ball joints, shackles, idler arm, pitman arm and control arm.
01.14 Demonstrate an understanding of manual and power steering operation such as power steering pump, power steering control valve and power steering fluid leaks.
01.15 Demonstrate an understanding of drum brake operation such as adjusters, wheel cylinder, pull, grab, chatter, noise, pulsations, fade and lining conditions.
01.16 Demonstrate an understanding of disc brake operation such as caliper, piston, pull, grab, chatter, pulsations, fade and lining conditions.
01.17 Demonstrate an understanding of brake system valve operation such as pressure differential valve, proportional valve, metering valve and brake warning light.
01.18 Demonstrate an understanding of basic heating and cooling systems.
01.19 Demonstrate an understanding of basic air conditioning systems.
01.20 Demonstrate knowledge of engine components.

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01.21 Demonstrate an understanding of basic ignition and fuel systems.

01.22 Demonstrate an understanding of rear axle operation such as differential action; limited slip mechanisms; floating, non-floating and semi-floating.

01.23 Demonstrate an understanding of drive shaft operation, drive shaft construction and universal joint operation such as single joint, constant velocity, joint working angle, joint phasing, slip joint, spline output and spline drive shaft.

01.24 Demonstrate an understanding of automatic transmission operation such as fluid coupling, torque converter, planetary gear system, power flow, hydraulic system, lubricant and cooling.

01.25 Demonstrate an understanding of clutch operation.

01.26 Demonstrate an understanding of clutch release mechanisms to include linkage and hydraulic.

01.27 Demonstrate an understanding of manual transmission operation such as torque multiplication, power flow, sliding gears, constant mesh gear, synchronizer action and shift mechanisms.

01.28 Demonstrate an understanding of overdrive operation.

01.29 Demonstrate knowledge of internal engine components.

01.30 Describe electrical terms, magnetism, electrical current flow and Ohm's law.

01.31 Demonstrate an understanding of series circuits.

01.32 Demonstrate an understanding of parallel circuits.

01.33 Demonstrate an understanding of series-parallel circuits.

01.34 Apply basic welding skills related to the automobile industry.

01.35 Demonstrate an understanding of advanced electronics concepts.

01.36 Demonstrate an understanding of electronic schematic diagrams and diagnostic techniques.

01.37 Demonstrate an understanding of electrical/electronic wire repair procedures.

01.38 Demonstrate an understanding of electronic semiconductor concepts and components.

01.39 Demonstrate an understanding of electronic transistor concepts and components.

01.40 Demonstrate an understanding of electronic microprocessor concepts, functions and components.

01.41 Adjust door hinges and striker plates.

01.42 Locate and correct rattles and noises.

01.43 Install door moldings.

01.44 Remove and replace electric window regulators.

01.45 Adjust electric window regulators.

01.46 Install air shocks.

01.47 Install C.B.'s and radios.

01.48 Touch up paint.

01.49 Lubricate hinges.

01.50 Adjust headlights. (ASE)

01.51 Inspect and replace passenger restraints.

01.52 Check vehicle visibility.

01.53 Check and adjust specified fluid levels.

02.0 APPLY ELECTRICAL AND ELECTRONIC SKILLS IN DIAGNOSING/TROUBLESHOOTING MALFUNCTIONS OF ELECTRICAL/ELECTRONIC COMPONENTS--The student will be able to:

02.01 Use and apply basic electrical and electronic test equipment and meters.
02.02 Perform power checks with test lights.
02.03 Perform continuity tests.
02.04 Measure voltage drop, current flow and resistance in a circuit or component with a multimeter. (ASE)
02.05 Locate an open circuit and a short circuit.
02.06 Analyze cranking system malfunctions.
02.07 Analyze charging system malfunctions. (ASE)
02.08 Service and test batteries.
02.09 Remove and replace light bulbs. (ASE)
02.10 Test, remove and replace fuses and circuit breakers. (ASE)
02.11 Replace and test starters. (ASE)
02.12 Test and replace alternators.
02.13 Test, remove and replace regulators. (ASE)
02.14 Inspect and repair lighting systems. (ASE)
02.15 Diagnose, repair or replace turn signal and stoplight switches. (ASE)
02.16 Test and replace electrical system switches. (ASE)
02.17 Diagnose, repair or replace power window and power seat systems, including motors.
02.18 Diagnose and service windshield wiper/washer systems. (ASE)
02.19 Test and replace sending units. (ASE)
02.20 Diagnose engine malfunctions.
02.21 Inspect, remove and replace alternator belts.
02.22 Overhaul starters. (ASE)
02.23 Diagnose, repair or replace horn systems. (ASE)
02.24 Diagnose, repair or replace clock systems.
02.25 Diagnose, repair or replace warning buzzer.
02.26 Test and replace instrument panel units. (ASE)
02.27 Diagnose and service cruise control systems. (ASE)
02.28 Check, remove and replace radios. (ASE)
02.29 Test and repair automotive alarm system components. (ASE)

03.0 DEMONSTRATE PROFICIENCY IN SERVICING STEERING, SUSPENSION AND WHEEL SYSTEMS--The student will be able to:

03.01 Diagnose suspension problems.
03.02 Diagnose wheel/tire vibrations, shimmy and tramp.
03.03 Diagnose steering problems.
03.04 Lubricate suspension, steering gear and linkage. (ASE)
03.05 Check manual steering gear fluid level. (ASE)
03.06 Inspect steering systems. (ASE)
03.07 Inspect suspension systems. (ASE)
03.08 Inspect and test shock absorbers.
03.09 Check power steering fluid level. (ASE)
03.10 Inspect, repair and replace tires and wheels.
03.11 Rotate wheels and tires. (ASE)
03.12 Balance wheels, (ASE)

03.13 Service wheel bearings and grease seals on nondrive axles/spindles. (ASE)
03.14 Remove and replace spindles and ball joints. (ASE)
03.15 Remove and replace shock absorbers and mountings. (ASE)
03.16 Measure and adjust torsion bar height. (ASE)
03.17 Remove and replace coil springs/torsion bars. (ASE)
03.18 Remove and replace control arms and bushings. (ASE)
03.19 Remove and replace steering linkage components.
03.20 Remove and replace steering dampers. (ASE)
03.21 Remove and replace steering dampers. (ASE)
03.22 Remove and replace manual/power steering gear assemblies.
03.23 Check two-wheel alignment.
03.24 Rebuild MacPherson type struts. (ASE)
03.25 Overhaul recirculating ball manual gears.
03.26 Rebuild rack-and-pinion manual gears. (ASE)
03.27 Remove and replace power steering pumps. (ASE)
03.28 Rebuild power steering pumps.
03.29 Overhaul integral steering gears.
03.30 Rebuild rack-and-pinion power steering assembly. (ASE)
03.31 Check four-wheel alignment.

04.0 DEMONSTRATE PROFICIENCY IN SERVICING AUTOMOTIVE BRAKE SYSTEMS--The student will be able to:

04.01 Diagnose brake system problems.
04.02 Diagnose combination valve malfunctions.
04.03 Perform operational inspections.
04.04 Inspect brake assemblies.
04.05 Remove and replace calipers and rotors. (ASE)
04.06 Refinish rotors. (ASE)
04.07 Rebuild calipers. (ASE)
04.08 Refinish brake drums. (ASE)
04.09 Replace drum brake shoes and disc pads. (ASE)
04.10 Identify anti-locking braking systems (ABS) principle and components.
04.11 Inspect and replace brake lines and hoses. (ASE)
04.12 Adjust brake shoes. (ASE)
04.13 Adjust parking brakes. (ASE)
04.14 Rebuild wheel cylinders. (ASE)
04.15 Remove and replace wheel cylinders, (ASE)
04.16 Bleed hydraulic brakes. (ASE)
04.17 Repair or replace parking brake cables and linkage. (ASE)
04.18 Remove and replace master cylinders. (ASE)
04.19 Remove and replace hydraulic power cylinders.
04.20 Flush brake systems. (ASE)
04.21 Service and repair power assist and brake control systems.
04.22 Service and repair front and rear disc brakes.
04.23 Replace hydraulic brake boosters. (ASE)
04.24 Inspect, diagnose and repair anti-locking brake systems.

05.0 DEMONSTRATE PROFICIENCY IN SERVICING COOLING, AIR CONDITIONING AND HEATING SYSTEMS--The student will be able to:

05.01 Diagnose overheating problems.

05.02 Check radiator coolant level.
05.03 Test and add coolant. (ASE)
05.04 Pressure test cooling systems.(ASE)
05.05 Test radiator caps. (ASE)
05.06 Inspect, remove and replace radiator and heater hoses. (ASE)
05.07 Remove, test and replace thermostats. (ASE)
05.08 Flush cooling systems and replace coolant.
05.09 Remove and replace radiators. (ASE)
05.10 Remove and replace water pumps.
05.11 Diagnose basic air conditioning system problems.
05.12 Inspect and pressure test basic air conditioning systems.
05.13 Inspect and pressure test basic air conditioning systems.
05.14 Discharge, evacuate and charge basic air conditioning systems. (ASE)
05.15 Leak test basic air conditioning systems. (ASE)
05.16 Service air conditioning electrical circuits.
05.17 Service vacuum circuits.
05.18 Remove and replace components in basic air conditioning systems. (ASE)
05.19 Remove and replace engine fan clutches and electric cooling fan and controls.
05.20 Remove and replace blower motors. (ASE)
05.21 Remove and replace heater cores, control units and cables. (ASE)
05.22 Diagnose and repair electronic air conditioning controls.
05.23 Remove and replace air conditioning compressor shaft seals.

06.0 DEMONSTRATE PROFICIENCY IN ENGINE PERFORMANCE SERVICE--The student will be able to:

06.01 Analyze engine performance.
06.02 Perform running cylinder balance tests.
06.03 Perform cylinder compression tests.
06.04 Check the performance of engines equipped with on-board computers.
06.05 Inspect, remove and replace points and condensers. (ASE)
06.06 Remove and replace distributor. (ASE)
06.07 Check the distributor advance in a vehicle.
06.08 Remove distributor; inspect, test and service.
06.09 Inspect and test primary circuits.
06.10 Remove and replace coils.
06.11 Remove and replace ignition switches and resistors.
06.12 Inspect, remove and replace ignition wires, caps and rotors.
06.13 Remove, gap and replace spark plugs. (ASE)
06.14 Service electronic ignition systems.
06.15 Service air cleaners. (ASE)
06.16 Inspect, remove and replace fuel filters. (ASE)
06.17 Measure fuel flow and pressure.
06.18 Remove and replace fuel lines. (ASE)
06.19 Remove and replace fuel pumps. (ASE)
06.20 Adjust idle speed.
06.21 Clean and adjust chokes. (ASE)
06.22 Inspect, remove and replace manifold control valves.
06.23 Remove and replace fuel injection system filters.

06.24 Set idle speed to specifications.
06.25 Remove and replace fuel injectors. (ASE)
06.26 Service throttle body fuel injection systems.
06.27 Service ported fuel injection systems.
06.28 Service positive crankcase ventilation (PCV) systems. (ASE)
06.29 Service evaporative control systems. (ASE)
06.30 Service thermostatic air cleaners. (ASE)
06.31 Service air-injection systems. (ASE)
06.32 Service exhaust gas recirculation (EGR) systems. (ASE)
06.33 Inspect, remove and replace catalytic converter. (ASE)
06.34 Diagnose mechanical, ignition and fuel emission problems.
06.35 Inspect, remove and replace exhaust system components. (ASE)
06.36 Inspect, remove and replace catalytic converters. (ASE)
06.37 Perform cylinder leakage tests.
06.38 Diagnose and correct malfunctions in computer control systems.
06.39 Diagnose, test and replace on-board computer controls.
06.40 Diagnose, service and replace computerized sensors.
06.41 Clean and overhaul electronically controlled carburetor systems. (ASE)
06.42 Remove and replace turbo chargers. (ASE)
06.43 Rebuild fuel injection pump. (ASE)
06.44 Check and adjust turbo charger waste gates. (ASE)
06.45 Test exhaust emissions using a four gas analyzer.
06.46 Service diesel injectors.
06.47 Remove and replace diesel engine fuel filters.
06.48 Check and adjust injection pump timing.
06.49 Remove and replace injection pumps.
06.50 Check and adjust idle and maximum speeds.
06.51 Test and service preheating systems.

07.0 DEMONSTRATE PROFICIENCY IN AUTOMATIC TRANSMISSION/TRANS-AXLE SERVICE--
The student will be able to:

07.01 Performance test automatic transmissions.
07.02 Change transmission oil and filter. (ASE)
07.03 Adjust linkage from the engine.
07.04 Adjust shift linkage. (ASE)
07.05 Adjust neutral safety switches.
07.06 Remove and replace external gaskets and seals.
07.07 Test vacuum shift modulator. (ASE)
07.08 Adjust bands. (ASE)
07.09 Pressure flush transmission cooler assemblies.
07.10 Diagnose malfunctions of automatic transmissions such as fluid leaks, fluid condition, slipping, lock up and shift problems.
07.11 Diagnose, repair and replace trans-axles.
07.12 Pressure test transmissions in vehicles. (ASE)
07.13 Test the electrical controls of an automatic clutch converter.
07.14 Service governors.
07.15 Service valve bodies.
07.16 Rebuild transmission assemblies (ASE)
07.17 Rebuild automatic trans-axle.
07.18 Pressure flush converter assemblies.
07.19 Remove and replace extension housings and bushings.

08.0 DEMONSTRATE PROFICIENCY IN SERVICING MANUAL DRIVE TRAINS AND AXLES--The student will be able to:

08.01 Diagnose drive line problems.
08.02 Diagnose and performance test manual transmission problems.
08.03 Inspect drive shafts, universal joints and center bearings.
08.04 Lubricate universal joints. (ASE)
08.05 Remove and replace transmission mounts. (ASE)
08.06 Remove and replace transmissions.
08.07 Adjust shift linkage. (ASE)
08.08 Adjust clutches. (ASE)
08.09 Remove and replace extension housing seals and bushings. (ASE)
08.10 Remove and replace clutches, release bearings, linkage and pilot bearings.
08.11 Rebuild or replace clutch master and slave cylinders. (ASE)
08.12 Remove and replace universal joints. (ASE)
08.13 Remove and replace speedometer gears and service speedometer cables. (ASE)
08.14 Remove and replace drive axle bearings and seals. (ASE)
08.15 Service and repair differentials. (ASE)
08.16 Remove and replace trans-axle assemblies.
08.17 Adjust trans-axle shifting controls.
08.18 Inspect, remove, replace and lubricate front drive axle flexible joints and boots.
08.19 Inspect, remove and replace constant-velocity universal joints.
08.20 Service manual transmissions to include overdrives. (ASE)
08.21 Overhaul trans-axle assemblies. (ASE)

09.0 DEMONSTRATE PROFICIENCY IN ENGINE REPAIR SERVICE--The student will be able to:

09.01 Clean engines. (ASE)
09.02 Remove and replace motor mounts.
09.03 Check valve guides for wear.
09.04 Reface valves and seats.
09.05 Perform cylinder balance tests.
09.06 Perform cylinder compression tests.
09.07 Perform cylinder leakage tests. (ASE)
09.08 Determine source(s) of oil/coolant loss.
09.09 Determine source(s) of excess noise. (ASE)
09.10 Determine cause(s) of overheating. (ASE)
09.11 Check the engine oil pressure.
09.12 Remove and replace core plugs. (ASE)
09.13 Inspect, remove and replace flywheels and ring gears.
09.14 Remove and replace engine assemblies. (ASE)
09.15 Remove and replace oil pans. (ASE)
09.16 Remove and replace oil pumps.
09.17 Clean cylinder blocks, oil passages and pistons.
09.18 Inspect blocks for warpage. (ASE)
09.19 Measure and inspect engine components for proper tolerances.
09.20 Remove and replace crankshafts, mains and rod bearings. (ASE)
09.21 Remove and replace camshafts and bushings. (ASE)
09.22 Remove and replace pistons and rings. (ASE)
09.23 Remove ridges and deglaze cylinder walls.

09.24 Remove and replace front and rear oil seals.
09.25 Remove and replace intake and exhaust manifolds. (ASE)
09.26 Remove, clean, inspect and replace cylinder heads; and inspect heads for cracks and warpage.(ASE)
09.27 Test and replace hydraulic lifters.
09.28 Remove and replace timing chains, belts and gears. (ASE)
09.29 Test valve springs. (ASE)
09.30 Adjust valve lifters. (ASE)
09.31 Replace rocker arm assemblies. (ASE)
09.32 Change oil and oil filters.

10.0 DEMONSTRATE PROFICIENCY IN MANAGEMENT SKILLS--The student will be able to:

10.01 Write and process work orders.
10.02 Process parts warranties and labor claims.
10.03 Process merchandise returns.
10.04 Accept and return cores/cards for rebuilt and exchange items.
10.05 Select and care for shop materials.
10.06 Use supervisory techniques for hiring and firing.
10.07 Prepare technical reports.
10.08 Perform business and technical computations.
10.09 Evaluate productivity.
10.10 Develop a customer relations plan.
10.11 Plan service facilities.
10.12 Schedule production.
10.13 Plan, organize, activate and control a service operation.
10.14 Perform auto safety inspections.

11.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

11.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
11.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
11.03 Read and follow written and oral instructions.
11.04 Answer and ask questions coherently and concisely.
11.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
11.06 Demonstrate appropriate telephone/communication skills.

12.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

12.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
12.03 Add, subtract, multiply and divide using fractions, decimals, a ' whole numbers.
12.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

12.05 Demonstrate an understanding of federal, state and local taxes and their computation.

13.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

13.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
13.02 Draw conclusions or make inferences from data.
13.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
13.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

14.01 Conduct a job search.
14.02 Secure information about a job.
14.03 Identify documents which may be required when applying for job interview.
14.04 Complete a job application form correctly.
14.05 Demonstrate competence in job interview techniques.
14.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
14.07 Identify and adopt acceptable work habits.
14.08 Demonstrate knowledge of how to make appropriate job changes.
14.09 Demonstrate acceptable employee health habits.
14.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

15.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

15.01 Define entrepreneurship.
15.02 Describe the importance of entrepreneurship to the American economy.
15.03 List the advantages and disadvantages of business ownership.
15.04 Identify the risks involved in ownership of a business.
15.05 Identify the necessary personal characteristics of a successful entrepreneur.
15.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CLUSTER CURRICULUM FRAMEWORK

Cluster Title: Automotive Technologies Cluster
Cluster Type: Job Preparatory
Occupational Area: Industrial Education
Components: Core, 2 Programs, and 10 Areas of Specialization

	SECONDARY	PSAV
Grade Level	9-12, 30, 31	30, 31
Facility Code	246	246
VSO:	VICA	VICA
Coop Method:	Yes	Yes
Apprenticeship:	Yes	Yes

I. **PURPOSE:** The purpose of the programs in this cluster is to prepare students for employment and/or specialized training in the automotive industry. The programs in this cluster also provide supplemental training for persons previously or currently employed in the automotive industry.

This cluster focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **CLUSTER STRUCTURE:** This cluster is a planned sequence of instruction consisting of two programs with a common core and 2 occupational completion points from the core. The Automotive Service Technology Program provides for 8 areas of automobile specialization. This structure will allow students who successfully complete specified competencies to exit for employment or continue into specialized training.

Students satisfactorily completing the Automotive Technology 95-96 program should be given credit for that phase of instruction should they subsequently enroll in Automotive Service Technology 95-96.

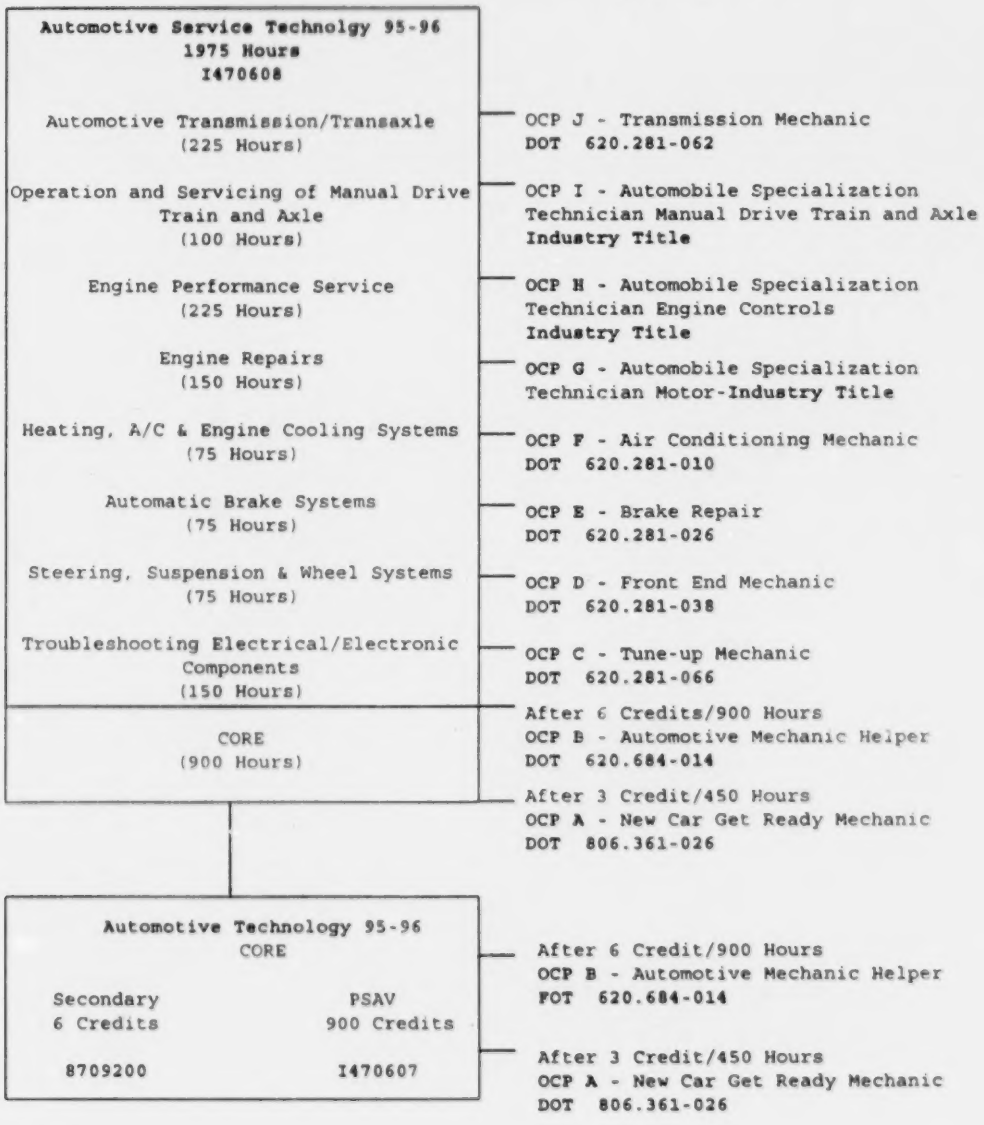
Competencies established by the Automotive Industries for "INDUSTRY TRAINING STANDARDS" plus integration of academic requirements and training in communications, leadership, human relations, employability skills and safe, efficient work practices account for 900 hours in the CORE curriculum.

Secondary students may exit the program at the end of six credits or advance to a postsecondary institution for specialized training. The required time for a typical postsecondary/adult vocational student to complete the Automotive Technology CORE program and 8 areas of specialization training at postsecondary institutions is 1,975 hours.

After successful completion of the competencies of the Automotive Technology program or demonstrated skills mastery of those competencies, students may articulate to Automotive Service Technology 95-96, Automotive Service Management Technology, Automotive Systems Option and/or Autotronics Option Program at a postsecondary institution. Algebra is recommended as a prerequisite for entry into the Associate of Science degree program.

The following diagram illustrates the Cluster Structure, Occupational Completion Points, and Job Titles:

Automotive Service Technology Cluster



When offered at the secondary level, the program in the cluster consists of the following courses which make up the core:

8709210 - Automotive Technology Assisting 1
8709220 - Automotive Technology Assisting 2
8709230 - Automotive Technology Assisting 3
8709240 - Automotive Technology Assisting 4
8709250 - Automotive Technology Assisting 5
8709260 - Automotive Technology Assisting 6

III. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of the Automotive Technologies cluster. These activities provide instruction in the use of automotive service equipment, tools, materials and processes found in the automotive service industry.

IV. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc. is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational student organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC. Planned and supervised instructional activities must be provided through one or more of the following: (1) directed laboratory experience (2) student projects (3) placement for experience (4) cooperative experience.

The cooperative method of instruction is appropriate for this program. Whenever the cooperative method is offered, the following is required for each student: a training agreement, a training plan signed by the student, teacher, and employer including instructional objectives and a list of on-the-job learning experiences and a work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must be paid for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade levels required for postsecondary adult vocational students to exit the programs in this cluster are listed at the program level or at the occupational completion points within the program. These grade level numbers correspond to a grade equivalent score obtained on one of the state designated basic skills examinations. If a student does not meet the basic skills level required for completion from the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) laboratory or prior to admission in an Adult Basic Education (ABE) setting.

When a student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards which the student must master to earn credit must be specified in the student's

Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP. To be transferable statewide between institutions, these programs/courses must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

SCANS Competencies: Instructional strategies for this program must include methods that require students to identify, organize and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate the methods to improve students' personal qualities and high-order thinking skills.

Program Title: Automotive Technology 95-96

July 1997

Florida Department of Education
INTENDED OUTCOMES

	Secondary	PSAV
Program Numbers	**8709200**	**I470607**
CIP Number	0647.060404	0647.060404
Program Number	8709200	I470607
Grade Level	9-12, 30, 31	30, 31
Length	6 credits	900 hours
Certification	AUTO MECH @7 G	AUTO IND @7 G
Basic Skills		
Math		10
Language		9
Reading		9

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
NEW CAR GET READY MECHANIC - DOT Code 806.361-026

01.0 Demonstrate proficiency in the equipment skills and safety regulations relating to the automotive industry.
(01.01 - 01.26)
02.0 Demonstrate proficiency in appropriate math skills.
(02.01 - 02.38)
03.0 Demonstrate proficiency in appropriate understanding of basic sciences.
(03.01 - 03.04)
04.0 Demonstrate proficiency in employability skills.
(04.01 - 04.10)
05.0 Demonstrate proficiency in appropriate communication skills.
(05.01 - 05.06)
06.0 Demonstrate proficiency in understanding of entrepreneurship.
(06.01 - 07.07)
07.0 Demonstrate proficiency in acceptable employee behavior in the automotive industry.
(07.01 - 07.14)
08.0 Demonstrate proficiency in the operation and servicing of automotive brake systems.
(08.01 - 08.08)
09.0 Demonstrate proficiency in routine maintenance and consumer services.
(09.01 - 09.48)
11.0 Demonstrate proficiency in heating, air conditioning and engine cooling systems.
(11.01 - 11.04)
12.0 Demonstrate proficiency in engine theory and repairs.
(12.01 - 12.04)
15.0 Demonstrate proficiency in diagnosing/troubleshooting electrical/electronic components as related to power train.

(15.01 - 15.12)

16.0 Demonstrate proficiency in engine performance service.
(16.01 - 16.14)

OCCUPATIONAL COMPLETION POINT - DATA CODE B

AUTOMOBILE MECHANIC HELPER- DOT Code 620.684-014

08.0 Demonstrate proficiency in the operation and servicing of automotive brake systems.
(08.09 - 08.26)

10.0 Demonstrate proficiency in the operation of steering, suspension and wheel systems.
(10.01 - 10.29)

11.0 Demonstrate proficiency in heating, air conditioning and engine cooling systems.
(11.05 - 11.27)

12.0 Demonstrate proficiency in engine theory and repairs.
(12.05 - 12.34)

13.0 Demonstrate proficiency in the operation and servicing of manual and drive trains and axles.
(13.01 - 13.24)

14.0 Demonstrate proficiency in the operation and servicing of automatic transmission/trans-axle.
(14.01 - 14.18)

15.0 Demonstrate proficiency in diagnosing/troubleshooting electrical/electronic components as related to power train.
(15.13 - 15.44)

16.0 Demonstrate proficiency in engine performance service.
(16.15 - 16.55)

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Automotive Technology
Secondary Number: 8709200
Postsecondary Number: I470607

01.0 DEMONSTRATE PROFICIENCY IN THE EQUIPMENT SKILLS AND SAFETY REGULATIONS RELATING TO THE AUTOMOTIVE INDUSTRY--The student will be able to:

01.01 Understand and practice safe work procedures.
01.02 Identify automotive shop safety hazards, methods to prevent and deal with accidents.
01.03 Identify and use appropriate emergency first aid procedures.
01.04 Demonstrate an understanding of automotive chemicals handling hazardous waste, including oil, coolant, asbestos and refrigerant.
01.05 Identify and practice using appropriate safety procedures when using floor jacks, safety stands, vehicle lifts and other lifting equipment.
01.06 Identify, use, and maintain hand and power tools properly.
01.07 Identify and practice using appropriate precision measuring tools and torque methods.
01.08 Identify and describe the proper procedure to apply and remove automotive fasteners, to include thread repair.
01.09 Identify and use metric and English measurement skills.
01.10 Read, interpret and use Technical Information Resources. (TIR).
01.11 Use computer and operate keyboard.
01.12 Identify automobiles according to engine location, cylinders, type of drive system, purpose, etc.
01.13 Describe and identify supplemental restraint systems (SRS).
01.14 Apply shop safety rules, EPA and OSHA standards.
01.15 Identify and practice safety procedures required when using various automotive chemicals, gaskets and sealers.
01.16 Identify and practice using appropriate gasoline safety rules.
01.17 Identify and practice using appropriate safety procedures for using compressed air and parts washers.
01.18 Identify and describe typical automotive lubricants and lubricant properties.
01.19 Interpret the Florida 'Workers Right To Know Law'.
01.20 Demonstrate an understanding of Material Safety Data Sheets.
01.21 Identify and describe typical automotive seals and gaskets.
01.22 Identify and use the proper procedures required for cutting tubing and single and double flaring.
01.23 Understand and interpret gears and gear ratios.

01.24 Utilize flat rate manuals, service manuals, service bulletins, parts manuals.

01.25 Demonstrate knowledge of the Automotive Service Excellence (ASE) Certification and other applicable certifications.

01.26 Disable supplemental restraint systems (SRS) in accordance with manufacturers' procedures.

02.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE MATH SKILLS--The student will be able to:

02.01 Read and interpret measuring devices (rules and tapes).
02.02 Add 100 addition combinations.
02.03 Add two-digit numbers.
02.04 Add three-digit numbers.
02.05 Subtract 100 subtraction combinations.
02.06 Subtract two-, three- and four-digit numbers.
02.07 Solve one-digit divisor problems.
02.08 Solve two-digit divisor problems.
02.09 Solve two- and three-digit divisor problems.
02.10 Solve multiplication facts.
02.11 Multiply by a one-digit factor.
02.12 Multiply by a two-digit factor.
02.13 Identify the parts of a fraction.
02.14 Solve fractional word problems.
02.15 Classify types of fractions.
02.16 Illustrate equivalent fractions.
02.17 Convert fractions.
02.18 Reduce fractions.
02.19 Solve decimal notations.
02.20 Solve number word problems.
02.21 Round to the nearest whole number.
02.22 Add decimals.
02.23 Subtract decimals.
02.24 Multiply decimals.
02.25 Divide a decimal by a decimal.
02.26 Divide a whole number by a decimal.
02.27 Write fractions as decimals and percents.
02.28 Write percents add fractions and decimals.
02.29 Solve percent problems.
02.30 Find the percent of a number.
02.31 Operate a calculator.
02.32 Understand and use the metric system.
02.33 Convert inches to millimeters and millimeters to inches.
02.34 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
02.35 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
02.36 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
02.37 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

02.38 Demonstrate an understanding of federal, state and local taxes and their computation.

03.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE UNDERSTANDING OF BASIC SCIENCES--The student will be able to:

03.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
03.02 Draw conclusions or make inferences from data.
03.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
03.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

04.0 DEMONSTRATE PROFICIENCY IN EMPLOYABILITY SKILLS--The student will be able to:

04.01 Secure information about a job.
04.02 Identify documents which may be required when applying for a job.
04.03 Complete a job application form correctly.
04.04 Identify and adopt acceptable work habits.
04.05 Demonstrate acceptable employee health habits.
04.06 Demonstrate appropriate telephone/communication skills.
04.07 Conduct a job search.
04.08 Demonstrate competence in job interview techniques.
04.09 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
04.10 Demonstrate knowledge of how to make job changes appropriately.

05.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

05.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
05.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
05.03 Read and follow written and oral instructions.
05.04 Answer and ask questions coherently and concisely.
05.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
05.06 Demonstrate appropriate telephone/communication skills.

06.0 DEMONSTRATE PROFICIENCY IN UNDERSTANDING OF ENTREPRENEURSHIP--After successfully completing this outcome, the student will be able to:

06.01 Define entrepreneurship.
06.02 Describe the importance of entrepreneurship to the American economy.

06.03 List the advantages and disadvantages of business ownership.
06.04 Identify the risks involved in ownership of business.
06.05 Identify the necessary personal characteristics of a successful entrepreneur.
06.06 Identify the business skills needed to operate a small business efficiently and effectively.
06.07 Identify and apply communication skills used in automotive careers.

07.0 DEMONSTRATE PROFICIENCY IN ACCEPTABLE EMPLOYEE BEHAVIOR IN THE AUTOMOTIVE INDUSTRY--The student will be able to:

07.01 Explain the effects of chemical/substance abuse.
07.02 Identify principles of stress management.
07.03 Perform auto safety inspections.
07.04 Identify and define career opportunities in the automotive service industry.
07.05 Explain and identify acceptable work ethics.
07.06 Explain acceptable dress standards.
07.07 Identify and demonstrate proper customer relations skills.
07.08 Write and process work orders.
07.09 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
07.10 Return cores for rebuilt and exchange items.
07.11 Identify and define payroll deductions (taxes, insurance, social security) and employee benefits.
07.12 Identify principles of time management.
07.13 Identify acceptable customer relations.
07.14 Interpret and verify complaint; determine needed repairs.

08.0 DEMONSTRATE PROFICIENCY IN THE OPERATION AND SERVICING OF AUTOMOTIVE BRAKE SYSTEMS--The student will be able to:

08.01 Select appropriate brake fluid and install to proper level.
08.02 Describe the functions and principles of automotive brake systems.
08.03 Describe the theory and operation of drum brakes.
08.04 Describe the theory and operation of disc brakes (front and rear).
08.05 Describe the theory and operation of vacuum, hydraulic and electronic assist power brake units.
08.06 Remove, refinish and replace brake drums and replace brake shoes.
08.07 Test pedal free travel with and without engine running; check power assist operation.
08.08 Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.
08.09 Identify the properties, varieties and use appropriate procedures to store and dispose of fluids, greases and lubricants in automotive brake systems.

08.10 Inspect brake system and diagnose for problems.
08.11 Measure and adjust pedal pushrod length.
08.12 Check master cylinder for internal and external leaks and proper operation; determine needed repairs.
08.13 Inspect and replace brake lines and hoses. (ASE)
08.14 Inspect brake lines and fittings for leaks, dents, kinks, rust, cracks, or wear, tighten loose fittings and supports.
08.15 Mount brake drum on lathe; machine braking surface.
08.16 Remove, clean, and inspect brake shoes, pads, springs, pins, clips, levers, adjusters/self-adjuster, other related brake hardware, and backing support plates; lubricate and reassemble.
08.17 Adjust brake, shoes, and reinstall brake drums or drum/hub assemblies and wheel bearings.
08.18 Remove, rebuild and replace wheel and master cylinders. (ASE)
08.19 Remove, refinish and replace rotors and replace disc pads. (ASE)
08.20 Remove caliper assembly from mountings; clean and inspect for leaks and damage to caliper housing.
08.21 Clean and inspect rotor; measure rotor with a dial indicator and a micrometer.
08.22 Diagnose combination valve malfunctions.
08.23 Repair, adjust or replace parking brake, cables and linkage. (ASE)
08.24 Check operation of parking brake indicator light system.
08.25 Check operation of brake stop light system; adjust and service as needed.
08.26 Describe the function and principles of anti-lock brake systems.

09.0 DEMONSTRATE PROFICIENCY IN ROUTINE MAINTENANCE AND CONSUMER SERVICES--The student will be able to:

09.01 Identify and interpret vehicle identification number information.
09.02 Perform redelivery preparation and minor auto detailing functions.
09.03 Inspect tires; check and adjust air pressure.
09.04 Identify and describe typical automotive lubricants and lubricant properties.
09.05 Check for proper fluid levels.
09.06 Identify the correct techniques use in "jump starting" vehicles.
09.07 Start a vehicle using jumper cables and a battery or auxiliary power supply.
09.08 Inspect, test, head and tail lamp circuits, aim headlights and replace bulbs.
09.09 Inspect, clean, fill or replace battery.
09.10 Perform slow/fast battery charge.
09.11 Perform oil change and lubricate vehicle.
09.12 Check power steering fluid level (ASE).

09.13 Check electrical circuits using jumper wires; determine needed repairs.
09.14 Inspect coolant condition; drain and recover.
09.15 Clean engines.
09.16 Remove and replace valve cover gaskets (ASE).
09.17 Service positive crankcase ventilation (PVC) system.
09.18 Inspect and clean battery cables, connectors, clamps, and hold-downs; repair or replace as needed.
09.19 Perform battery state-of-charge test; determine needed service.
09.20 Flush power steering system.
09.21 Inspect and test fusible links, circuit breakers, and fuses; replace as needed.
09.22 Check electrical circuits with a test light; determine needed repairs.
09.23 Check manual steering gear fluid level (ASE).
09.24 Dismount, inspect, repair, and remount tire on wheel.
09.25 Reinstall wheel; torque lug nuts.
09.26 Inspect and adjust alternator drive belts; replace as needed.
09.27 Perform tire repairs, tire assembly and wheel balancing.
09.28 Rotate tires according to manufacturer's recommendations.
09.29 Inspect, adjust or replace and adjust power steering pump belt.
09.30 Install audio system components.
09.31 Measure voltage drops, current flow, resistance, open, and short circuits.
09.32 Inspect and test switches, connectors, and wires of electrical/electronic circuits; repair or replace as needed.
09.33 Check radiator coolant level, test and add coolant. (ASE)
09.34 Inspect thermostat and housing: replace as needed.
09.35 Inspect and replace engine cooling and heater system hoses.
09.36 Inspect, test, and replace radiator, pressure cap, and collant recovery system.
09.37 Identify types and uses of automotive engine oils.
09.38 Inspect exhaust manifold, exhaust pipes, mufflers, resonators, tail pipes, and heat shields; repair or replace as needed.
09.39 Check transmission/trans-axle fluid levels and change fluids and filters.
09.40 Inspect passenger restraint system, repair if needed.
09.41 Maintain or restore electronic memory functions.
09.42 Inspect A/C compressor drive belts; replace and adjust as needed.
09.43 Inspect engine cooling and heater system hoses and belts; replace as needed.
09.44 Inspect coolant; drain, flush, refill, and bleed cooling system with recommended coolant.
09.45 Service exhaust gas recirculation (EGR) systems. (ASE)
09.46 Remove and replace fuel injection system filters.

09.47 Remove and replace speedometer gears and service speedometer cables. (ASE)

09.48 Measure and diagnose the cause(s) of abnormal key-off battery drain; determine needed repairs.

10.0 DEMONSTRATE PROFICIENCY IN THE OPERATION OF STEERING, SUSPENSION AND WHEEL SYSTEMS--The student will be able to:

10.01 Identify the properties, varieties and use appropriate procedures to store and dispose of fluids, greases and lubricants in steering, and wheel systems.

10.02 Describe fundamentals of rack-and-pinion steering systems.

10.03 Describe fundamentals of power steering systems.

10.04 Identify components and function of steering and suspension systems.

10.05 Identify tire sizes, construction and application.

10.06 Measure wheel, tire, axle, and hub runout; determine needed repairs.

10.07 Identify and use appropriate procedures for inspecting, repairing and replacing tires and wheels. (ASE)

10.08 Identify and use appropriate procedures for rotating and balancing wheels and tires. (ASE)

10.09 Identify and use appropriate procedures for diagnosing wheel/tire vibrations, shimmy and tramp; determine needed repairs.

10.10 Diagnose tire pull (lead) problem; determine corrective actions.

10.11 Identify the function of steering and suspension system components.

10.12 Inspect steering system and diagnose problems. (ASE)

10.13 Identify and use appropriate procedures in repacking wheel bearings and replacing grease seals on non-drive axles/drive axles and spindles. (ASE).

10.14 Identify and describe automotive bearings.

10.15 Remove, inspect, and service or replace front or rear wheel bearings.

10.16 Remove, clean, inspect, repack, and reinstall wheel bearings and replace seals; reinstall hub and adjust wheel bearings.

10.17 Identify and use appropriate procedures for inspecting, testing and replacing shock absorbers and selective ride systems.

10.18 Identify and use appropriate procedures for servicing MacPherson type struts. (ASE)

10.19 Identify use of appropriate steering geometry and suspension geometry to include caster, camber and toe-in and steering axis inclination.

10.20 Identify appropriate procedures for checking alignment (front and rear) and diagnosing problems.

10.21 Identify and use appropriate procedures for measuring, adjusting and/or replacing a torsion bar. (ASE)

10.22 Inspect suspension system and diagnose problems.

10.23 Identify procedures for removal and replacement of power steering pumps. (ASE)

10.24 Identify procedures for removal and replacement of manual/power steering gear assemblies.

10.25 Identify procedures for removal and replacement of spindles and ball joints.

10.26 Identify procedures for removal and replacement of rear suspension parts.

10.27 Describe the principles of ride-height control systems.

10.28 Remove and replace steering dampers and/or steering linkage components. (ASE)

10.29 Identify appropriate procedures for removing and replacing control arms, coil springs and bushings. (ASE)

11.0 DEMONSTRATE PROFICIENCY IN HEATING, AIR-CONDITIONING AND ENGINE COOLING SYSTEMS--The student will be able to:

11.01 Identify the properties, varieties and use appropriate procedures to store and dispose of fluids, greases and lubricants in air conditioning and engine cooling systems.

11.02 Inspect, service and replace drive belts.

11.03 Describe heating and air conditioning principles.

11.04 Diagnose A/C system problems that cause the pressure protection devices to interrupt system operation; repair as needed.

11.05 Apply proper safety procedures used when servicing automotive air conditioning and engine cooling systems.

11.06 Inspect, test, and replace radiator, pressure cap, and coolant recovery system.

11.07 Pressure test cooling systems/radiator caps. (ASE)

11.08 Remove and replace water pumps.

11.09 Describe cooling fan operations and use appropriate test procedures for electrical, mechanical and thermo-hydraulic systems.

11.10 Clean, inspect, and test fan, fan clutch (electrical and mechanical), and fan shroud; replace as needed.

11.11 Diagnose overheating problems.

11.12 Remove heater core, diagnose problems and service control units, cables and replace. (ASE)

11.13 Inspect and test electrical fan control system and circuits.

11.14 Inspect, diagnose, flush and pressure test basic air conditioning system.

11.15 Label and store refrigerant.

11.16 Discharge, evacuate and charge an air conditioning system using refrigerant recovery equipment.

11.17 Identify procedures for removal and replacement of components in an air conditioning system. (ASE)

11.18 Service vacuum circuits.

11.19 Perform engine vacuum tests; determine needed repairs.

11.20 Inspect and test A/C-heater control panel assembly; replace as needed.

11.21 Diagnose the cause of temperature control problems in the heater/ventilation system; determine needed repairs.
11.22 Inspect and test A/C-heater ducts, doors, hoses, and outlets; replace as needed.
11.23 Inspect and test heater control valve(s) (manual, vacuum, and electrical types); replace as needed.
11.24 Test recycled refrigerant for non-condensable gases.
11.25 Verify correct operation of refrigerant handling equipment.
11.26 Identify and recover A/C system refrigerant.
11.27 Diagnose the cause of failures in the vacuum and mechanical controls of the heating and A/C system; determine needed repairs.

12.0 DEMONSTRATE PROFICIENCY IN ENGINE THEORY AND REPAIRS--The student will be able to:

12.01 Interpret basic automotive engine theory, components, and functions.
12.02 Identify engine components.
12.03 Check for proper fluid levels.
12.04 Interpret engine lubrication systems.
12.05 Inspect engine assembly for fuel, oil, coolant, and other leaks; determine needed repairs.
12.06 Describe valve train operation.
12.07 Inspect valves; resurface or replace.
12.08 Inspect valve seats; resurface or replace.
12.09 Deglaze and clean cylinder walls.
12.10 Identify procedures for removal and replacement of engine assemblies. (ASE)
12.11 Describe proper procedure for engine disassembly and reassembly. (ASE)
12.12 Describe exhaust system components and functions.
12.13 Remove and replace engine mounts.
12.14 Perform oil pressure tests; determine assess repairs.
12.15 Determine source(s) of oil/coolant loss. (ASE)
12.16 Remove and replace oil pan gasket.
12.17 Remove and replace exhaust gaskets. (ASE)
12.18 Inspect, repair or replace crankshaft vibration damper (harmonic balancer).
12.19 Remove and replace core plugs. (ASE)
12.20 Inspect and replace pans, covers, gaskets, and seals.
12.21 Remove and replace timing chains, belts and gears.
12.22 Remove and replace engine oil pump.
12.23 Measure and inspect oil pumps for proper tolerances.
12.24 Remove and replace intake gaskets. (ASE)
12.25 Remove and replace cylinder head gaskets.
12.26 Inspect cylinder heads for cracks and warpage. (ASE)
12.27 Inspect cylinder blocks for warpage. (ASE)
12.28 Prime engine lubrication system.
12.29 Remove cylinder wall ridges.
12.30 Reinstall cylinder head(s) and gasket(s).

12.31 Check valve face-to-seat contact and valve seat concentricity (runout); service seats and valves as needed.
12.32 Measure and inspect engine components for proper tolerances.
12.33 Inspect, measure, service or replace pistons.
12.34 Inspect, measure, and install piston rings.

13.0 DEMONSTRATE PROFICIENCY IN THE OPERATION AND SERVICING OF MANUAL DRIVE TRAINS AND AXLES--The student will be able to:

13.01 Identify the properties, varieties and use appropriate procedures to store and dispose of fluids, greases and lubricants in manual drive trains.
13.02 Identify and describe typical automotive lubricants and lubricant properties.
13.03 Use proper safety procedures when servicing manual drive train axles.
13.04 Describe basic manual transmission theory and operation.
13.05 Identify drive shaft operations and construction.
13.06 Adjust shift linkage. (ASE)
13.07 Adjust clutch linkage.
13.08 Identify clutch operations.
13.09 Describe the principles of differential operations.
13.10 Demonstrate drive shaft operations, construction and relate assemblies.
13.11 Identify rear axle operations.
13.12 Inspect, service, and replace front-wheel bearings and locking hubs.
13.13 Check four-wheel drive assembly seals and vents; check lube level.
13.14 Describe overdrive theory and operations.
13.15 Diagnose drive line and drive axle problems.
13.16 Inspect, service and performance test manual transmissions.
13.17 Diagnose clutch noise, binding, slippage, pulsation, and chatter problems.
13.18 Adjust trans-axle shifting controls.
13.19 Remove and replace transmission mounts. (ASE)
13.20 Remove and reinstall transmission.
13.21 Inspect and replace speedometer drive gear, driven gear, and retainers.
13.22 Inspect, remove and replace constant-velocity/universal joints.
13.23 Inspect, remove, replace and lubricate front drive axle, flexible joints and boots.
13.24 Service differentials. (ASE)

14.0 DEMONSTRATE PROFICIENCY IN THE OPERATION AND SERVICING OF AUTOMATIC TRANSMISSION/TRANS-AXLE--The student will be able to:

14.01 Service transmission; perform visual inspection; replace fluids and filters.

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14.02 Identify and describe typical automotive seals and gaskets.
14.03 Inspect and replace external seals and gaskets.
14.04 Identify the properties, varieties and use appropriate procedures to store and dispose of fluids, greases and lubricants in an automatic transmission/trans-axle.
14.05 Identify and describe typical automotive lubricants and lubricant properties.
14.06 Use proper safety procedures when servicing automatic transmissions.
14.07 Identify automotive shop safety hazards, methods to prevent and deal with accidents.
14.08 Describe the principles of automatic transmission operations including planetary gears, clutches, bands, hydraulic circuits and torque converters.
14.09 Adjust neutral safety switches.
14.10 Remove and replace external gaskets and seals.
14.11 Test shift modulators. (ASE)
14.12 Flush torque converter and transmission cooling system.
14.14 Identify automotive shop safety hazards, methods to prevent and deal with accidents.
14.14 Inspect and diagnose malfunctions of automatic transmissions such as fluid , leaks, temperature and slipping.
14.15 Adjust selector shift linkage. (ASE)
14.16 Adjust throttle linkage from the engine.
14.17 Adjust transmission.
14.18 Describe the principles of the computer controlled transmissions.

15.0 DEMONSTRATE PROFICIENCY IN DIAGNOSING/TROUBLESHOOTING ELECTRICAL/ELECTRONIC COMPONENTS AS RELATED TO POWER TRAIN--The student will be able to:

15.01 Measure properties of a circuit using analog volt-ohm meters, digital volt-ohm meters and oscilloscopes.
15.02 Analyze and measure DC circuits using AVON, DOOM, oscilloscope, frequency counter and function generator.
15.03 Describe automotive battery construction, and use appropriate service and test procedures.
15.04 Describe basic generator/alternator theory, operation and use appropriate test procedures.
15.05 Relate electricity to the nature of matter.
15.06 Identify sources of electricity.
15.07 Define voltage, current, resistance, power and energy.
15.08 Read and interpret schematics, electrical color codes and symbols.
15.09 Perform battery capacity (load, high-rate discharge) test; determine needed service.
15.10 Remove, inspect, and replace/reinstall alternator, and adjust drive belt.
15.11 Inspect and test voltage regulator; replace as needed.
15.12 Examine starting systems and perform starter current draw and circuit voltage drop.

15.13 Solve problems in electronic units using metric prefixes.
15.14 Apply Ohm's Law to series circuits.
15.15 Construct and verify operation of series circuits.
15.16 Analyze and troubleshoot series circuits.
15.17 Describe magnetic properties of circuits and devices.
15.18 Identify properties of an AC signal.
15.19 Identify AC sources.
15.20 Analyze and measure AC signals utilizing AVOM, DVOM, oscilloscope, frequency counter and function generator.
15.21 Describe the characteristics of AC capacitive circuits.
15.22 Describe the characteristics of AC inductive circuits.
15.23 Apply Ohm's Law to parallel circuits.
15.24 Verify the operation of parallel circuits.
15.25 Analyze and troubleshoot parallel circuits.
15.26 Apply Ohm's Law to combination circuits.
15.27 Construct and verify the operation of combination circuits.
15.28 Troubleshoot combination circuits.
15.29 Inspect, repair and replace electrical system switches.
15.30 Describe basic motor theory, operation and use appropriate test procedures.
15.31 Use acceptable soldering and desoldering techniques.
15.32 Make electrical connections.
15.33 Perform starter free-running (bench) tests; determine needed repairs.
15.34 Disassemble, clean, inspect, and test alternator components; replace as needed.
15.35 Remove and replace/reinstall starter.
15.36 Inspect, diagnose, and test the cause of no turn signal or hazard light operation or light with no flash on one or both sides; repair or replace as needed.
15.37 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
15.38 Find shorts, grounds, opens, and high resistance problems in electrical/electronic circuits; determine needed repairs.
15.39 Determine the physical and electrical characteristics of capacitors and inductors.
15.40 Diagnose, repair, or replace power window, seat, windshield, wiper/washer systems.
15.41 Test and replace sending units.
15.42 Diagnose the cause of brighter than normal, intermittent, dim or no light operation.
15.43 Use wiring diagrams during diagnosis of electrical circuit problems.
15.44 Identify and explain electronic semiconductor, transistor, and microprocessor concepts and components.

16.0 DEMONSTRATE PROFICIENCY IN ENGINE PERFORMANCE SERVICE--The student will be able to:

16.01 Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels and calibration decals).
16.02 Apply proper safety procedures when performing engine performance service.
16.03 Service air cleaners (ASE).
16.04 Service evaporative control system (ASE).
16.05 Service thermostatic air cleaner.
16.06 Describe the exhaust gas recirculation (EGR) systems. (ASE)
16.07 Inspect, remove and replace exhaust system components. (ASE)
16.08 Identify basic electronic ignition system principles, components and functions.
16.09 Inspect and test primary circuits.
16.10 Inspect ant test power and ground circuits and connections; service or replace as needed.
16.11 Clean and adjust chokes. (ASE)
16.12 Inspect and test mechanical and electrical fuel pumps and pump control systems; replace as needed.
16.13 Describe the principles of the air injection system.
16.14 Describe the function of exhaust heat shields.
16.15 Check fuel for contaminants and quality.
16.16 Practice recommended precautions when handling static sensitive devices.
16.17 Remove and replace ignition switch. (ASE)
16.18 Inspect, remove and replace ignition wires, distributor cap and rotor.
16.19 inspect and test distributor; service as needed.
16.20 Remove, gap and replace spark plugs. (ASE)
16.21 Understand basic carburetor type fuel systems.
16.22 Inspect, remove and replace fuel filters. (ASE)
16.23 Identify basic emission control system components and functio.
16.24 Diagnose the cause(s) of emissions problems resulting from failure of the positive crankcase ventilation system.
16.25 Diagnose the cause(s) of emissions problems resulting from failure of the idle and deceleration speed control system.
16.26 Service air injection systems. (ASE)
16.27 Analyze engine performance by utilizing manufacturer's diagnostic procedures and equipment.
16.28 Describe the principles of and service electronic fuel injection systems.
16.29 Inspect, remove and replace manifold control valve.
16.30 Describe the chemical combustion process (CO_2, H_2O), including products of incomplete combustion (HC, CO and NO).
16.31 Inspect and test ignition system secondary circuit wiring and components; replace as needed.

16.32 Inspect and test ignition coil(s); replace as needed.
16.33 Inspect and test ignition control module; replace as needed.
16.34 Perform tune-up and adjust to manufacturer specifications.
16.35 Remove and replace fuel lines. (ASE)
16.36 Remove and replace carburetors. (ASE)
16.37 Test and service air inlet temperature control systems. (ASE)
16.38 Diagnose the cause(s) of emissions problems resulting from failure of the air injection or catalytic converter systems.
16.39 Remove and replace air pumps, check valves, lines and hoses.
16.40 Perform cranking vacuum, cylinder balance, compression, and cylinder leakage tests.
16.41 Identify procedures to use an external vacuum source and vacuum gauge to check engine performance.
16.42 Identify computer command control system components and know their functions.
16.43 Describe procedures used for cleaning fuel injectors.
16.44 Describe distributable ignition system components and know their function.
16.45 Clean and adjust choke, set idle speed.
16.46 Test and replace ignition ballast resistors. (ASE)
16.47 Check and adjust (where applicable) ignition system timing and timing advance/retard.
16.48 Remove, clean, and reinstall throttle body; adjust related linkages.
16.49 Service ported fuel injection systems.
16.50 Check/adjust idle speed and fuel mixture where applicable.
16.51 Inspect and test positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; service or replace as needed.
16.52 Inspect fuel tank and fuel cap; inspect and replace fuel lines, fittings, and hoses, remove and replace fuel tanks.
16.53 Read and follow vacuum hose routing schematics.
16.54 Test fuel pump pressure and volume and compare to specifications.
16.55 Remove and replace fuel gage tank units.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8709210
Course Title: Automotive Technology Assisting 1
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to automotive technologies. These competencies relate to equipment skills and safety regulations, proficiency in appropriate math skills, an appropriate understanding of basic sciences, proficiency in employability skills, and proficiency in the operation and servicing of automotive brake systems.

01.0 DEMONSTRATE PROFICIENCY IN THE EQUIPMENT SKILLS AND SAFETY REGULATIONS RELATING TO THE AUTOMOTIVE INDUSTRY--The student will be able to:

- 01.01 Understand and practice safe work procedures.
- 01.02 Identify automotive shop safety hazards, methods to prevent and deal with accidents.
- 01.03 Identify and use appropriate emergency first aid procedures.
- 01.04 Demonstrate an understanding of automotive chemicals handling hazardous waste, including oil, coolant, asbestos and refrigerant.
- 01.05 Identify and practice using appropriate safety procedures when using floor jacks, safety stands, vehicle lifts and other lifting equipment.
- 01.06 Identify, use, and maintain hand and power tools properly.
- 01.07 Identify and practice using appropriate precision measuring tools and torque methods.
- 01.08 Identify and describe the proper procedure to apply and remove automotive fasteners, to include thread repair.
- 01.09 Identify and use metric and English measurement skills.
- 01.10 Read, interpret and use Technical Information Resources. (TIR).
- 01.11 Use computer and operate keyboard.
- 01.12 Identify automobiles according to engine location, cylinders, type of drive system, purpose, etc.
- 01.13 Describe and identify supplemental restraint systems (SRS).
- 01.14 Apply shop safety rules, EPA and OSHA standards.

02.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE MATH SKILLS--The student will be able to:

- 02.01 Read and interpret measuring devices (rules and tapes).
- 02.02 Add 100 addition combinations.
- 02.03 Add two-digit numbers.

02.04 Add three-digit numbers.
02.05 Subtract 100 subtraction combinations.
02.06 Subtract two-, three- and four-digit numbers.
02.07 Solve one-digit divisor problems.
02.08 Solve two-digit divisor problems.
02.09 Solve two- and three-digit divisor problems.
02.10 Solve multiplication facts.
02.11 Multiply by a one-digit factor.
02.12 Multiply by a two-digit factor.
02.13 Identify the parts of a fraction.
02.14 Solve fractional word problems.
02.15 Classify types of fractions.
02.16 Illustrate equivalent fractions.
02.17 Convert fractions.
02.18 Reduce fractions.
02.19 Solve decimal notations.
02.20 Solve number word problems.
02.21 Round to the nearest whole number.
02.22 Add decimals.
02.23 Subtract decimals.
02.24 Multiply decimals.
02.25 Divide a decimal by a decimal.
02.26 Divide a whole number by a decimal.
02.27 Write fractions as decimals and percents.
02.28 Write percents add fractions and decimals.
02.29 Solve percent problems.
02.30 Find the percent of a number.
02.31 Operate a calculator.
02.32 Understand and use the metric system.
02.33 Convert inches to millimeters and millimeters to inches.
02.34 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
02.35 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
02.36 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
02.37 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
02.38 Demonstrate an understanding of federal, state and local taxes and their computation.

03.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE UNDERSTANDING OF BASIC SCIENCES--The student will be able to:

03.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
03.02 Draw conclusions or make inferences from data.
03.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

03.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

04.0 DEMONSTRATE PROFICIENCY IN EMPLOYABILITY SKILLS--The student will be able to:

04.01 Secure information about a job.
04.02 Identify documents which may be required when applying for a job.
04.03 Complete a job application form correctly.
04.04 Identify and adopt acceptable work habits.
04.05 Demonstrate acceptable employee health habits.
04.06 Demonstrate appropriate telephone/communication skills.
04.07 Conduct a job search.
04.08 Demonstrate competence in job interview techniques.
04.09 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
04.10 Demonstrate knowledge of how to make job changes appropriately.

08.0 DEMONSTRATE PROFICIENCY IN THE OPERATION AND SERVICING OF AUTOMOTIVE BRAKE SYSTEMS--The student will be able to:

08.01 Select appropriate brake fluid and install to proper level.
08.02 Describe the functions and principles of automotive brake systems.
08.03 Describe the theory and operation of drum brakes.
08.04 Describe the theory and operation of disc brakes (front and rear).
08.05 Describe the theory and operation of vacuum, hydraulic and electronic assist power brake units.
08.06 Remove, refinish and replace brake drums and replace brake shoes.
08.07 Test pedal free travel with and without engine running; check power assist operation.
08.08 Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8709220
Course Title: Automotive Technology Assisting 2
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to the automotive industry. These competencies relate to equipment skills and safety regulations, demonstrate proficiency in appropriate communication skills, in routine maintenance/consumer services, in heating, air conditioning and engine cooling systems, and in engine theory and repairs.

01.0 DEMONSTRATE PROFICIENCY IN THE EQUIPMENT SKILLS AND SAFETY REGULATIONS RELATING TO THE AUTOMOTIVE INDUSTRY--The student will be able to:

- 01.15 Identify and practice safety procedures required when using various automotive chemicals, gaskets and sealers.
- 01.16 Identify and practice using appropriate gasoline safety rules.
- 01.17 Identify and practice using appropriate safety procedures for using compressed air and parts washers.
- 01.18 Identify and describe typical automotive lubricants and lubricant properties.
- 01.19 Interpret the "Florida Workers Right To Know Law".

05.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 05.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 05.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 05.03 Read and follow written and oral instructions.
- 05.04 Answer and ask questions coherently and concisely.
- 05.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 05.06 Demonstrate appropriate telephone/communication skills.

09.0 DEMONSTRATE PROFICIENCY IN ROUTINE MAINTENANCE AND CONSUMER SERVICES--The student will be able to:

- 09.01 Identify and interpret vehicle identification number information.
- 09.02 Perform redelivery preparation and minor auto detailing functions.
- 09.03 Inspect tires; check and adjust air pressure.

09.04 Identify and describe typical automotive lubricants and lubricant properties.
09.05 Check for proper fluid levels.
09.06 Identify the correct techniques use in "jump starting" vehicles.
09.07 Start a vehicle using jumper cables and a battery or auxiliary power supply.
09.08 Inspect, test, head and tail lamp circuits, aim headlights and replace bulbs.
09.09 Inspect, clean, fill or replace battery.
09.10 Perform slow/fast battery charge.
09.11 Perform oil change and lubricate vehicle.
09.12 Check power steering fluid level (ASE).
09.13 Check electrical circuits using jumper wires; determine needed repairs.
09.14 Inspect coolant condition; drain and recover.
09.15 Clean engines.
09.16 Remove and replace valve cover gaskets (ASE).
09.17 Service positive crankcase ventilation (PVC) system.
09.18 Inspect and clean battery cables, connectors, clamps, and hold-downs; repair or replace as needed.
09.19 Perform battery state-of-charge test; determine needed service.
09.20 Flush power steering system.
09.21 Inspect and test fusible links, circuit breakers, and fuses; replace as needed.
09.22 Check electrical circuits with a test light; determine needed repairs.
09.23 Check manual steering gear fluid level (ASE).
09.24 Dismount, inspect, repair, and remount tire on wheel.
09.25 Reinstall wheel; torque lug nuts.
09.26 Inspect and adjust alternator drive belts; replace as needed.
09.27 Perform tire repairs, tire assembly and wheel balancing.
09.28 Rotate tires according to manufacturer's recommendations.
09.29 Inspect, adjust or replace and adjust power steering pump belt.

11.0 DEMONSTRATE PROFICIENCY IN HEATING, AIR CONDITIONING AND ENGINE COOLING SYSTEMS--The student will be able to:

11.01 Identify the properties, varieties and use appropriate procedures to store and dispose of fluids, greases and lubricants in air conditioning and engine cooling systems.
11.02 Inspect, service and replace drive belts.
11.03 Describe heating and air conditioning principles.
11.04 Diagnose A/C system problems that cause the pressure protection devices to interrupt system operation; repair as needed.

12.0 DEMONSTRATE PROFICIENCY IN ENGINE THEORY AND REPAIRS--The student will be able to:

12.01 Interpret basic automotive engine theory, components, and functions.
12.02 Identify engine components.
12.03 Check for proper fluid levels.
12.04 Interpret engine lubrication systems.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8709230
Course Title: Automotive Technology Assisting 3
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to automotive technologies. These competencies relate to equipment skills and safety regulations, demonstrate proficiency in understanding entrepreneurship, in acceptable employee behavior, in routine maintenance/consumer services, in diagnosing/troubleshooting electrical/electronic components as related to power train, and in engine performance service.

01.0 DEMONSTRATE PROFICIENCY IN THE EQUIPMENT SKILLS AND SAFETY REGULATIONS RELATING TO THE AUTOMOTIVE INDUSTRY--The student will be able to:

- 01.20 Demonstrate an understanding of Material Safety Data Sheets.
- 01.21 Identify and describe typical automotive seals and gaskets.
- 01.22 Identify and use the proper procedures required for cutting tubing and single and double flaring.
- 01.23 Understand and interpret gears and gear ratios.
- 01.24 Utilize flat rate manuals, service manuals, service bulletins, parts manuals.
- 01.25 Demonstrate knowledge of the Automotive Service Excellence (ASE) Certification and other applicable certifications.
- 01.26 Disable supplemental restraint systems (SRS) in accordance with manufacturers' procedures.

06.0 DEMONSTRATE PROFICIENCY IN UNDERSTANDING OF ENTREPRENEURSHIP--After successfully completing this outcome, the student will be able to:

- 06.01 Define entrepreneurship.
- 06.02 Describe the importance of entrepreneurship to the American economy.
- 06.03 List the advantages and disadvantages of business ownership.
- 06.04 Identify the risks involved in ownership of business.
- 06.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 06.06 Identify the business skills needed to operate a small business efficiently and effectively.
- 06.07 Identify and apply communication skills used in automotive careers.

07.0 DEMONSTRATE PROFICIENCY IN ACCEPTABLE EMPLOYEE BEHAVIOR IN THE AUTOMOTIVE INDUSTRY--The student will be able to:

07.01 Explain the effects of chemical/substance abuse.
07.02 Identify principles of stress management.
07.03 Perform auto safety inspections.
07.04 Identify and define career opportunities in the automotive service industry.
07.05 Explain and identify acceptable work ethics.
07.06 Explain acceptable dress standards.
07.07 Identify and demonstrate proper customer relations skills.
07.08 Write and process work orders.
07.09 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
07.10 Return cores for rebuilt and exchange items.
07.11 Identify and define payroll deductions (taxes, insurance, social security) and employee benefits.
07.12 Identify principles of time management.
07.13 Identify acceptable customer relations.
07.14 Interpret and verify complaint; determine needed repairs.

09.0 DEMONSTRATE PROFICIENCY IN ROUTINE MAINTENANCE AND CONSUMER SERVICES--The student will be able to:

09.30 Install audio system components.
09.31 Measure voltage drops, current flow, resistance, open, and short circuits.
09.32 Inspect and test switches, connectors, and wires of electrical/electronic circuits; repair or replace as needed.
09.33 Check radiator coolant level, test and add coolant. (ASE)
09.34 Inspect thermostat and housing: replace as needed.
09.35 Inspect and replace engine cooling and heater system hoses.
09.36 Inspect, test, and replace radiator, pressure cap, and collant recovery system.
09.37 Identify types and uses of automotive engine oils.
09.38 Inspect exhaust manifold, exhaust pipes, mufflers, resonators, tail pipes, and heat shields; repair or replace as needed.
09.39 Check transmission/trans-axle fluid levels and change fluids and filters.
09.40 Inspect passenger restraint system, repair if needed.
09.41 Maintain or restore electronic memory functions.
09.42 Inspect A/C compressor drive belts; replace and adjust as needed.
09.43 Inspect engine cooling and heater system hoses and belts; replace as needed.
09.44 Inspect coolant; drain, flush, refill, and bleed cooling system with recommended coolant.
09.45 Service exhaust gas recirculation (EGR) systems. (ASE)

09.46 Remove and replace fuel injection system filters.
09.47 Remove and replace speedometer gears and service speedometer cables. (ASE)
09.48 Measure and diagnose the cause(s) of abnormal key-off battery drain; determine needed repairs.

15.0 DEMONSTRATE PROFICIENCY IN DIAGNOSING/TROUBLESHOOTING ELECTRICAL/ELECTRONIC COMPONENTS AS RELATED TO POWER TRAIN--The student will be able to:

15.01 Measure properties of a circuit using analog volt-ohm meters, digital volt-ohm meters and oscilloscopes.
15.02 Analyze and measure DC circuits using AVON, DOOM, oscilloscope, frequency counter and function generator.
15.03 Describe automotive battery construction, and use appropriate service and test procedures.
15.04 Describe basic generator/alternator theory, operation and use appropriate test procedures.
15.05 Relate electricity to the nature of matter.
15.06 Identify sources of electricity.
15.07 Define voltage, current, resistance, power and energy.
15.08 Read and interpret schematics, electrical color codes and symbols.
15.09 Perform battery capacity (load, high-rate discharge) test; determine needed service.
15.10 Remove, inspect, and replace/reinstall alternator, and adjust drive belt.
15.11 Inspect and test voltage regulator; replace as needed.
15.12 Examine starting systems and perform starter current draw and circuit voltage drop.

16.0 DEMONSTRATE PROFICIENCY IN ENGINE PERFORMANCE SERVICE--The student will be able to:

16.01 Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels and calibration decals).
16.02 Apply proper safety procedures when performing engine performance service.
16.03 Service air cleaners (ASE).
16.04 Service evaporative control system (ASE).
16.05 Service thermostatic air cleaner.
16.06 Describe the exhaust gas recirculation (EGR) systems. (ASE)
16.07 Inspect, remove and replace exhaust system components. (ASE)
16.08 Identify basic electronic ignition system principles, components and functions.
16.09 Inspect and test primary circuits.
16.10 Inspect ant test power and ground circuits and connections; service or replace as needed.
16.11 Clean and adjust chokes. (ASE)
16.12 Inspect and test mechanical and electrical fuel pumps and pump control systems; replace as needed.

16.13 Describe the principles of the air injection system.
16.14 Describe the function of exhaust heat shields.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8709240
Course Title: Automotive Technology Assisting 4
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to the automotive industry. These competencies relate to equipment skills and safety regulations, demonstrate proficiency in the operation and servicing of automotive brake systems, in heating, air conditioning and engine cooling systems, and in the operation and servicing of manual drive trains and axles.

08.0 DEMONSTRATE PROFICIENCY IN THE OPERATION AND SERVICING OF AUTOMOTIVE BRAKE SYSTEMS--The student will be able to:

08.09 Identify the properties, varieties and use appropriate procedures to store and dispose of fluids, greases and lubricants in automotive brake systems.
08.10 Inspect brake system and diagnose for problems.
08.11 Measure and adjust pedal pushrod length.
08.12 Check master cylinder for internal and external leaks and proper operation; determine needed repairs.
08.13 Inspect and replace brake lines and hoses. (ASE)
08.14 Inspect brake lines and fittings for leaks, dents, kinks, rust, cracks, or wear, tighten loose fittings and supports.
08.15 Mount brake drum on lathe; machine braking surface.
08.16 Remove, clean, and inspect brake shoes, pads, springs, pins, clips, levers, adjusters/self-adjuster, other related brake hardware, and backing support plates; lubricate and reassemble.
08.17 Adjust brake, shoes, and reinstall brake drums or drum/hub assemblies and wheel bearings.
08.18 Remove, rebuild and replace wheel and master cylinders. (ASE)
08.19 Remove, refinish and replace rotors and replace disc pads. (ASE)
08.20 Remove caliper assembly from mountings; clean and inspect for leaks and damage to caliper housing.
08.21 Clean and inspect rotor; measure rotor with a dial indicator and a micrometer.
08.22 Diagnose combination valve malfunctions.
08.23 Repair, adjust or replace parking brake, cables and linkage. (ASE)
08.24 Check operation of parking brake indicator light system.
08.25 Check operation of brake stop light system; adjust and service as needed.
08.26 Describe the function and principles of anti-lock brake systems.

11.0 DEMONSTRATE PROFICIENCY IN HEATING, AIR CONDITIONING AND ENGINE COOLING SYSTEMS--The student will be able to:

11.05 Apply proper safety procedures used when servicing automotive air conditioning and engine cooling systems.
11.06 Inspect, test, and replace radiator, pressure cap, and coolant recovery system.
11.07 Pressure test cooling systems/radiator caps. (ASE)
11.08 Remove and replace water pumps.
11.09 Describe cooling fan operations and use appropriate test procedures for electrical, mechanical and thermo-hydraulic systems.
11.10 Clean, inspect, and test fan, fan clutch (electrical and mechanical), and fan shroud; replace as needed.
11.11 Diagnose overheating problems.
11.12 Remove heater core, diagnose problems and service control units, cables and replace. (ASE)
11.13 Inspect and test electrical fan control system and circuits.
11.14 Inspect, diagnose, flush and pressure test basic air conditioning system.
11.15 Label and store refrigerant.
11.16 Discharge, evacuate and charge an air conditioning system using refrigerant recovery equipment.
11.17 Identify procedures for removal and replacement of components in an air conditioning system. (ASE)
11.18 Service vacuum circuits.
11.19 Perform engine vacuum tests; determine needed repairs.
11.20 Inspect and test A/C-heater control panel assembly; replace as needed.
11.21 Diagnose the cause of temperature control problems in the heater/ventilation system; determine needed repairs.
11.22 Inspect and test A/C-heater ducts, doors, hoses, and outlets; replace as needed.
11.23 Inspect and test heater control valve(s) (manual, vacuum, and electrical types); replace as needed.
11.24 Test recycled refrigerant for non-condensable gases.
11.25 Verify correct operation of refrigerant handling equipment.
11.26 Identify and recover A/C system refrigerant.
11.27 Diagnose the cause of failures in the vacuum and mechanical controls of the heating and A/C system; determine needed repairs.

13.0 DEMONSTRATE PROFICIENCY IN THE OPERATION AND SERVICING OF MANUAL DRIVE TRAINS AND AXLES--The student will be able to:

13.01 Identify the properties, varieties and use appropriate procedures to store and dispose of fluids, greases and lubricants in manual drive trains.
13.02 Identify and describe typical automotive lubricants and lubricant properties.

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13.03 Use proper safety procedures when servicing manual drive train axles.
13.04 Describe basic manual transmission theory and operation.
13.05 Identify drive shaft operations and construction.
13.06 Adjust shift linkage. (ASE)
13.07 Adjust clutch linkage.
13.08 Identify clutch operations.
13.09 Describe the principles of differential operations.
13.10 Demonstrate drive shaft operations, construction and relate assemblies.
13.11 Identify rear axle operations.
13.12 Inspect, service, and replace front-wheel bearings and locking hubs.
13.13 Check four-wheel drive assembly seals and vents; check lube level.
13.14 Describe overdrive theory and operations.
13.15 Diagnose drive line and drive axle problems.
13.16 Inspect, service and performance test manual transmissions.
13.17 Diagnose clutch noise, binding, slippage, pulsation, and chatter problems.
13.18 Adjust trans-axle shifting controls.
13.19 Remove and replace transmission mounts. (ASE)
13.20 Remove and reinstall transmission.
13.21 Inspect and replace speedometer drive gear, driven gear, and retainers.
13.22 Inspect, remove and replace constant-velocity/universal joints.
13.23 Inspect, remove, replace and lubricate front drive axle, flexible joints and boots.
13.24 Service differentials. (ASE)

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8709250
Course Title: Automotive Technology Assisting 5
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to the automotive industry. These competencies relate to equipment skills and safety regulations, demonstrate proficiency in the operation of steering, suspension and wheel systems, in engine theory and repairs, and in engine performance service.

10.0 DEMONSTRATE PROFICIENCY IN THE OPERATION OF STEERING, SUSPENSION AND WHEEL SYSTEMS--The student will be able to:

10.01 Identify the properties, varieties and use appropriate procedures to store and dispose of fluids, greases and lubricants in steering, and wheel systems.
10.02 Describe fundamentals of rack-and-pinion steering systems.
10.03 Describe fundamentals of power steering systems.
10.04 Identify components and function of steering and suspension systems.
10.05 Identify tire sizes, construction and application.
10.06 Measure wheel, tire, axle, and hub runout; determine needed repairs.
10.07 Identify and use appropriate procedures for inspecting, repairing and replacing tires and wheels. (ASE)
10.08 Identify and use appropriate procedures for rotating and balancing wheels and tires. (ASE)
10.09 Identify and use appropriate procedures for diagnosing wheel/tire vibrations, shimmy and tramp; determine needed repairs.
10.10 Diagnose tire pull (lead) problem; determine corrective actions.
10.11 Identify the function of steering and suspension system components.
10.12 Inspect steering system and diagnose problems. (ASE)
10.13 Identify and use appropriate procedures in repacking wheel bearings and replacing grease seals on non-drive axles/drive axles and spindles. (ASE).
10.14 Identify and describe automotive bearings.
10.15 Remove, inspect, and service or replace front or rear wheel bearings.
10.16 Remove, clean, inspect, repack, and reinstall wheel bearings and replace seals; reinstall hub and adjust wheel bearings.
10.17 Identify and use appropriate procedures for inspecting, testing and replacing shock absorbers and selective ride systems.

10.18 Identify and use appropriate procedures for servicing MacPherson type struts. (ASE)

10.19 Identify use of appropriate steering geometry and suspension geometry to include caster, camber and toe-in and steering axis inclination.

10.20 Identify appropriate procedures for checking alignment (front and rear) and diagnosing problems.

10.21 Identify and use appropriate procedures for measuring, adjusting and/or replacing a torsion bar. (ASE)

10.22 Inspect suspension system and diagnose problems.

10.23 Identify procedures for removal and replacement of power steering pumps. (ASE)

10.24 Identify procedures for removal and replacement of manual/power steering gear assemblies.

10.25 Identify procedures for removal and replacement of spindles and ball joints.

10.26 Identify procedures for removal and replacement of rear suspension parts.

10.27 Describe the principles of ride-height control systems.

10.28 Remove and replace steering dampers and/or steering linkage components. (ASE)

10.29 Identify appropriate procedures for removing and replacing control arms, coil springs and bushings. (ASE)

12.0 DEMONSTRATE PROFICIENCY IN ENGINE THEORY AND REPAIRS--The student will be able to:

12.05 Inspect engine assembly for fuel, oil, coolant, and other leaks; determine needed repairs.

12.06 Describe valve train operation.

12.07 Inspect valves; resurface or replace.

12.08 Inspect valve seats; resurface or replace.

12.09 Deglaze and clean cylinder walls.

12.10 Identify procedures for removal and replacement of engine assemblies. (ASE)

12.11 Describe proper procedure for engine disassembly and reassembly. (ASE)

12.12 Describe exhaust system components and functions.

12.13 Remove and replace engine mounts.

12.14 Perform oil pressure tests; determine assess repairs.

12.15 Determine source(s) of oil/coolant loss. (ASE)

12.16 Remove and replace oil pan gasket.

12.17 Remove and replace exhaust gaskets. (ASE)

12.18 Inspect, repair or replace crankshaft vibration damper (harmonic balancer).

12.19 Remove and replace core plugs. (ASE)

12.20 Inspect and replace pans, covers, gaskets, and seals.

12.21 Remove and replace timing chains, belts and gears.

12.22 Remove and replace engine oil pump.

12.23 Measure and inspect oil pumps for proper tolerances.

12.24 Remove and replace intake gaskets. (ASE)

12.25 Remove and replace cylinder head gaskets.

12.26 Inspect cylinder heads for cracks and warpage. (ASE)

12.27 Inspect cylinder blocks for warpage. (ASE)

12.28 Prime engine lubrication system.
12.29 Remove cylinder wall ridges.
12.30 Reinstall cylinder head(s) and gasket(s).
12.31 Check valve face-to-seat contact and valve seat concentricity (runout); service seats and valves as needed.
12.32 Measure and inspect engine components for proper tolerances.
12.33 Inspect, measure, service or replace pistons.
12.34 Inspect, measure, and install piston rings.

16.0 DEMONSTRATE PROFICIENCY IN ENGINE PERFORMANCE SERVICE--The student will be able to:

16.15 Check fuel for contaminants and quality.
16.16 Practice recommended precautions when handling static sensitive devices.
16.17 Remove and replace ignition switch. (ASE)
16.18 Inspect, remove and replace ignition wires, distributor cap and rotor.
16.19 inspect and test distributor; service as needed.
16.20 Remove, gap and replace spark plugs. (ASE)
16.21 Understand basic carburetor type fuel systems.
16.22 Inspect, remove and replace fuel filters. (ASE)
16.23 Identify basic emission control system components and functio.
16.24 Diagnose the cause(s) of emissions problems resulting from failure of the positive crankcase ventilation system.
16.25 Diagnose the cause(s) of emissions problems resulting from failure of the idle and deceleration speed control system.
16.26 Service air injection systems. (ASE)
16.27 Analyze engine performance by utilizing manufacturer's diagnostic procedures and equipment.
16.28 Describe the principles of and service electronic fuel injection systems.
16.29 Inspect, remove and replace manifold control valve.
16.30 Describe the chemical combustion process (CO_2, H_2O), including products of incomplete combustion (HC, CO and NO).
16.31 Inspect and test ignition system secondary circuit wiring and components; replace as needed.
16.32 Inspect and test ignition coil(s); replace as needed.
16.33 Inspect and test ignition control module; replace as needed.
16.34 Perform tune-up and adjust to manufacturer specifications.
16.35 Remove and replace fuel lines. (ASE)
16.36 Remove and replace carburetors. (ASE)
16.37 Test and service air inlet temperature control systems. (ASE)

16.38 Diagnose the cause(s) of emissions problems resulting from failure of the air injection or catalytic converter systems.

16.39 Remove and replace air pumps, check valves, lines and hoses.

16.40 Perform cranking vacuum, cylinder balance, compression, and cylinder leakage tests.

16.41 Identify procedures to use an external vacuum source and vacuum gauge to check engine performance.

16.42 Identify computer command control system components and know their functions.

16.43 Describe procedures used for cleaning fuel injectors.

16.44 Describe distributable ignition system components and know their function.

16.45 Clean and adjust choke, set idle speed.

16.46 Test and replace ignition ballast resistors. (ASE)

16.47 Check and adjust (where applicable) ignition system timing and timing advance/retard.

16.48 Remove, clean, and reinstall throttle body; adjust related linkages.

16.49 Service ported fuel injection systems.

16.50 Check/adjust idle speed and fuel mixture where applicable.

16.51 Inspect and test positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; service or replace as needed.

16.52 Inspect fuel tank and fuel cap; inspect and replace fuel lines, fittings, and hoses, remove and replace fuel tanks.

16.53 Read and follow vacuum hose routing schematics.

16.54 Test fuel pump pressure and volume and compare to specifications.

16.55 Remove and replace fuel gage tank units.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8709260
Course Title: Automotive Technology Assisting 6
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to the automotive industry. These competencies relate to equipment skills and safety regulations, demonstrate proficiency in the operation and servicing of automatic transmission/trans-axle, and in diagnosing/troubleshooting electrical/electronic components as related to power train.

14.0 DEMONSTRATE PROFICIENCY IN THE OPERATION AND SERVICING OF AUTOMATIC TRANSMISSION/TRANS-AXLE--The student will be able to:

14.01 Service transmission; perform visual inspection; replace fluids and filters.
14.02 Identify and describe typical automotive seals and gaskets.
14.03 Inspect and replace external seals and gaskets.
14.04 Identify the properties, varieties and use appropriate procedures to store and dispose of fluids, greases and lubricants in an automatic transmission/trans-axle.
14.05 Identify and describe typical automotive lubricants and lubricant properties.
14.06 Use proper safety procedures when servicing automatic transmissions.
14.07 Identify automotive shop safety hazards, methods to prevent and deal with accidents.
14.08 Describe the principles of automatic transmission operations including planetary gears, clutches, bands, hydraulic circuits and torque converters.
14.09 Adjust neutral safety switches.
14.10 Remove and replace external gaskets and seals.
14.11 Test shift modulators. (ASE)
14.12 Flush torque converter and transmission cooling system.
14.13 Identify automotive shop safety hazards, methods to prevent and deal with accidents.
14.14 Inspect and diagnose malfunctions of automatic transmissions such as fluid , leaks, temperature and slipping.
14.15 Adjust selector shift linkage. (ASE)
14.16 Adjust throttle linkage from the engine.
14.17 Adjust transmission.
14.18 Describe the principles of the computer controlled transmissions.

15.0 DEMONSTRATE PROFICIENCY IN DIAGNOSING/TROUBLESHOOTING ELECTRICAL/ELECTRONIC COMPONENTS AS RELATED TO POWER TRAIN--The student will be able to:

15.13 Solve problems in electronic units using metric prefixes.
15.14 Apply Ohm's Law to series circuits.
15.15 Construct and verify operation of series circuits.
15.16 Analyze and troubleshoot series circuits.
15.17 Describe magnetic properties of circuits and devices.
15.18 Identify properties of an AC signal.
15.19 Identify AC sources.
15.20 Analyze and measure AC signals utilizing AVOM, DVOM, oscilloscope, frequency counter and function generator.
15.21 Describe the characteristics of AC capacitive circuits.
15.22 Describe the characteristics of AC inductive circuits.
15.23 Apply Ohm's Law to parallel circuits.
15.24 Verify the operation of parallel circuits.
15.25 Analyze and troubleshoot parallel circuits.
15.26 Apply Ohm's Law to combination circuits.
15.27 Construct and verify the operation of combination circuits.
15.28 Troubleshoot combination circuits.
15.29 Inspect, repair and replace electrical system switches.
15.30 Describe basic motor theory, operation and use appropriate test procedures.
15.31 Use acceptable soldering and desoldering techniques.
15.32 Make electrical connections.
15.33 Perform starter free-running (bench) tests; determine needed repairs.
15.34 Disassemble, clean, inspect, and test alternator components; replace as needed.
15.35 Remove and replace/reinstall starter.
15.36 Inspect, diagnose, and test the cause of no turn signal or hazard light operation or light with no flash on one or both sides; repair or replace as needed.
15.37 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
15.38 Find shorts, grounds, opens, and high resistance problems in electrical/electronic circuits; determine needed repairs.
15.39 Determine the physical and electrical characteristics of capacitors and inductors.
15.40 Diagnose, repair, or replace power window, seat, windshield, wiper/washer systems.
15.41 Test and replace sending units.
15.42 Diagnose the cause of brighter than normal, intermittent, dim or no light operation.
15.43 Use wiring diagrams during diagnosis of electrical circuit problems.
15.44 Identify and explain electronic semiconductor, transistor, and microprocessor concepts and components.

July 1997

Florida Department of Education
INTENDED OUTCOMES

	PSAV
Program Numbers	**I470608**
CIP Number	0647.060405
Grade Level	30, 31
Length	1975 hours
Certification	AUTO IND @7 G
Basic Skills	
Math	10
Language	9
Reading	9

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
NEW CAR GET READY MECHANIC - DOT Code 806.361-026

01.0 Demonstrate proficiency in the equipment skills and safety regulations relating to the automotive industry.
(01.01 - 01.26)
02.0 Demonstrate proficiency in appropriate math skills.
(02.01 - 02.38)
03.0 Demonstrate proficiency in appropriate understanding of basic sciences.
(03.01 - 03.04)
04.0 Demonstrate proficiency in employability skills.
(04.01 - 04.10)
05.0 Demonstrate proficiency in appropriate communication skills.
(05.01 - 05.06)
06.0 Demonstrate proficiency in understanding of entrepreneurship.
(06.01 - 07.07)
07.0 Demonstrate proficiency in acceptable employee behavior in the automotive industry.
(07.01 - 07.14)
08.0 Demonstrate proficiency in the operation and servicing of automotive brake systems.
(08.01 - 08.08)
09.0 Demonstrate proficiency in routine maintenance and consumer services.
(09.01 - 09.48)
11.0 Demonstrate proficiency in heating, air conditioning and engine cooling systems.
(11.01 - 11.04)
12.0 Demonstrate proficiency in engine theory and repairs.
(12.01 - 12.04)

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15.0 Demonstrate proficiency in diagnosing/troubleshooting electrical/electronic components as related to power train. (15.01 - 15.12)
16.0 Demonstrate proficiency in engine performance service. (16.01 - 16.14)

OCCUPATIONAL COMPLETION POINT - DATA CODE B
AUTOMOBILE MECHANIC HELPER - DOT Code 620.684-014

08.0 Demonstrate proficiency in the operation and servicing of automotive brake systems. (08.09 - 08.26)
10.0 Demonstrate proficiency in the operation of steering, suspension and wheel systems. (10.01 - 10.29)
11.0 Demonstrate proficiency in heating, air conditioning and engine cooling systems. (11.05 - 11.27)
12.0 Demonstrate proficiency in engine theory and repairs. (12.05 - 12.34)
13.0 Demonstrate proficiency in the operation and servicing of manual and drive trains and axles. (13.01 - 13.24)
14.0 Demonstrate proficiency in the operation and servicing of automatic transmission/trans-axle. (14.01 - 14.18)
15.0 Demonstrate proficiency in diagnosing/troubleshooting electrical/electronic components as related to power train. (15.13 - 15.44)
16.0 Dlemonstrate proficiency in engine performance service. (16.15 - 16.55)

SPECIALIZATION INTENDED OUTCOMES

OCCUPATIONAL COMPLETION POINT - DATA CODE C
TUNE-UP MECHANIC - DOT Code 620.281-066
(Prerequisite for Occupational Completion Points D - J)

15.0 Demonstrate proficiency in diagnosing/troubleshooting electrical/electronic components. (15.45 - 15.61)

OCCUPATIONAL COMPLETION POINT - DATA CODE D
FRONT END MECHANIC - DOT Code 620.281-038

08.0 Demonstrate proficiency in the operation and servicing of automotive brake systems. (08.27 - 08.48)

OCCUPATIONAL COMPLETION POINT - DATA CODE E
BRAKE REPAIRER - DOT Code 620.281-026

10.0 Demonstrate proficiency in the operation and servicing of steering, suspension and wheel systems.
(10.30 - 10.71)

OCCUPATIONAL COMPLETION POINT - DATA CODE F
AIR CONDITIONING MECHANIC - DOT Code 620.281-010

11.0 Demonstrate proficiency in heating, air conditioning and engine cooling systems.
(11.28 - 11.53)

OCCUPATIONAL COMPLETION POINT - DATA CODE G
AUTOMOBILE SPECIALIZATION TECHNICIAN MOTOR - Industry Title

12.0 Demonstrate proficiency in engine theory and repairs.
(12.35 - 12.63)

OCCUPATIONAL COMPLETION POINT - DATA CODE H
AUTOMOBILE SPECIALIZATION TECHNICIAN ENGINE CONTROLS - Industry Title

16.0 Demonstrate proficiency in engine performance service.
(16.56 - 16.99)

OCCUPATIONAL COMPLETION POINT - DATA CODE I
AUTOMOBILE SPECIALIZATION TECHNICIAN MANUAL DRIVE TRAIN AND AXLE - Industry Title

13.0 Demonstrate proficiency in the operation and servicing of manual and drive trains and axles.
(13.25 - 13.77)

OCCUPATIONAL COMPLETION POINT - DATA CODE J
TRANSMISSION MECHANIC - DOT Code 620.281-062

14.0 Demonstrate proficiency in the operation and servicing of automatic transmission/trans-axle.
(14.19 - 14.46)

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Automotive Service Technology
Secondary Number:
Postsecondary Number: I470608

01.0 DEMONSTRATE PROFICIENCY IN THE EQUIPMENT SKILLS AND SAFETY REGULATIONS RELATING TO THE AUTOMOTIVE INDUSTRY--The student will be able to:

01.01 Understand and practice safe work procedures.
01.02 Identify automotive shop safety hazards, methods to prevent and deal with accidents.
01.03 Identify and use appropriate emergency first aid procedures.
01.04 Demonstrate an understanding of automotive chemicals handling hazardous waste, including oil, coolant, asbestos and refrigerant.
01.05 Identify and practice using appropriate safety procedures when using floor jacks, safety stands, vehicle lifts and other lifting equipment.
01.06 Identify, use, and maintain hand and power tools properly.
01.07 Identify and practice using appropriate precision measuring tools and torque methods.
01.08 Identify and describe the proper procedure to apply and remove automotive fasteners, to include thread repair.
01.09 Identify and use metric and English measurement skills.
01.10 Read, interpret and use Technical Information Resources. (TIR).
01.11 Use computer and operate keyboard.
01.12 Identify automobiles according to engine location, cylinders, type of drive system, purpose, etc.
01.13 Describe and identify supplemental restraint systems (SRS).
01.14 Apply shop safety rules, EPA and OSHA standards.
01.15 Identify and practice safety procedures required when using various automotive chemicals, gaskets and sealers.
01.16 Identify and practice using appropriate gasoline safety rules.
01.17 Identify and practice using appropriate safety procedures for using compressed air and parts washers.
01.18 Identify and describe typical automotive lubricants and lubricant properties.
01.19 Interpret the "Florida Workers Right-To-Know Law".
01.20 Demonstrate an understanding of Material Safety Data Sheets.
01.21 Identify and describe typical automotive seals and gaskets.
01.22 Identify and use the proper procedures required for cutting tubing and single and double flaring.
01.23 Understand and interpret gears and gear ratios.

01.24 Utilize flat rate manuals, service manuals, service bulletins, parts manuals.

01.25 Demonstrate knowledge of the Automotive Service Excellence (ASE) Certification and other applicable certifications.

01.26 Disable supplemental restraint systems (SRS) in accordance with manufacturers' procedures.

02.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE MATH SKILLS--The student will be able to:

02.01 Read and interpret measuring devices (rules and tapes).
02.02 Add 100 addition combinations.
02.03 Add two-digit numbers.
02.04 Add three-digit numbers.
02.05 Subtract 100 subtraction combinations.
02.06 Subtract two-, three- and four-digit numbers.
02.07 Solve one-digit divisor problems.
02.08 Solve two-digit divisor problems.
02.09 Solve two- and three-digit divisor problems.
02.10 Solve multiplication facts.
02.11 Multiply by a one-digit factor.
02.12 Multiply by a two-digit factor.
02.13 Identify the parts of a fraction.
02.14 Solve fractional word problems.
02.15 Classify types of fractions.
02.16 Illustrate equivalent fractions.
02.17 Convert fractions.
02.18 Reduce fractions.
02.19 Solve decimal notations.
02.20 Solve number word problems.
02.21 Round to the nearest whole number.
02.22 Add decimals.
02.23 Subtract decimals.
02.24 Multiply decimals.
02.25 Divide a decimal by a decimal.
02.26 Divide a whole number by a decimal.
02.27 Write fractions as decimals and percents.
02.28 Write percents add fractions and decimals.
02.29 Solve percent problems.
02.30 Find the percent of a number.
02.31 Operate a calculator.
02.32 Understand and use the metric system.
02.33 Convert inches to millimeters and millimeters to inches.
02.34 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
02.35 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
02.36 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
02.37 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

02.38 Demonstrate an understanding of federal, state and local taxes and their computation.

03.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE UNDERSTANDING OF BASIC SCIENCES--The student will be able to:

03.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
03.02 Draw conclusions or make inferences from data.
03.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
03.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

04.0 DEMONSTRATE PROFICIENCY IN EMPLOYABILITY SKILLS--The student will be able to:

04.01 Secure information about a job.
04.02 Identify documents which may be required when applying for a job.
04.03 Complete a job application form correctly.
04.04 Identify and adopt acceptable work habits.
04.05 Demonstrate acceptable employee health habits.
04.06 Demonstrate appropriate telephone/communication skills.
04.07 Conduct a job search.
04.08 Demonstrate competence in job interview techniques.
04.09 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
04.10 Demonstrate knowledge of how to make job changes appropriately.

05.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

05.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
05.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
05.03 Read and follow written and oral instructions.
05.04 Answer and ask questions coherently and concisely.
05.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
05.06 Demonstrate appropriate telephone/communication skills.

06.0 DEMONSTRATE PROFICIENCY IN UNDERSTANDING OF ENTREPRENEURSHIP--After successfully completing this outcome, the student will be able to:

06.01 Define entrepreneurship.
06.02 Describe the importance of entrepreneurship to the American economy.

06.03 List the advantages and disadvantages of business ownership.
06.04 Identify the risks involved in ownership of business.
06.05 Identify the necessary personal characteristics of a successful entrepreneur.
06.06 Identify the business skills needed to operate a small business efficiently and effectively.
06.07 Identify and apply communication skills used in automotive careers.

07.0 DEMONSTRATE PROFICIENCY IN ACCEPTABLE EMPLOYEE BEHAVIOR IN THE AUTOMOTIVE INDUSTRY--The student will be able to:

07.01 Explain the effects of chemical/substance abuse.
07.02 Identify principles of stress management.
07.03 Perform auto safety inspections.
07.04 Identify and define career opportunities in the automotive service industry.
07.05 Explain and identify acceptable work ethics.
07.06 Explain acceptable dress standards.
07.07 Identify and demonstrate proper customer relations skills.
07.08 Write and process work orders.
07.09 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
07.10 Return cores for rebuilt and exchange items.
07.11 Identify and define payroll deductions (taxes, insurance, social security) and employee benefits.
07.12 Identify principles of time management.
07.13 Identify acceptable customer relations.
07.14 Interpret and verify complaint; determine needed repairs.

08.0 DEMONSTRATE PROFICIENCY IN THE OPERATION AND SERVICING OF AUTOMOTIVE BRAKE SYSTEMS--The student will be able to:

08.01 Select appropriate brake fluid and install to proper level.
08.02 Describe the functions and principles of automotive brake systems.
08.03 Describe the theory and operation of drum brakes.
08.04 Describe the theory and operation of disc brakes (front and rear).
08.05 Describe the theory and operation of vacuum, hydraulic and electronic assist power brake units.
08.06 Remove, refinish and replace brake drums and replace brake shoes.
08.07 Test pedal free travel with and without engine running; check power assist operation.
08.08 Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.
08.09 Identify the properties, varieties and use appropriate procedures to store and dispose of fluids, greases and lubricants in automotive brake systems.

08.10 Inspect brake system and diagnose for problems.

08.11 Measure and adjust pedal pushrod length.

08.12 Check master cylinder for internal and external leaks and proper operation; determine needed repairs.

08.13 Inspect and replace brake lines and hoses. (ASE)

08.14 Inspect brake lines and fittings for leaks, dents, kinks, rust, cracks, or wear, tighten loose fittings and supports.

08.15 Mount brake drum on lathe; machine braking surface.

08.16 Remove, clean, and inspect brake shoes, pads, springs, pins, clips, levers, adjusters/self-adjuster, other related brake hardware, and backing support plates; lubricate and reassemble.

08.17 Adjust brake, shoes, and reinstall brake drums or drum/hub assemblies and wheel bearings.

08.18 Remove, rebuild and replace wheel and master cylinders. (ASE)

08.19 Remove, refinish and replace rotors and replace disc pads. (ASE)

08.20 Remove caliper assembly from mountings; clean and inspect for leaks and damage to caliper housing.

08.21 Clean and inspect rotor; measure rotor with a dial indicator and a micrometer.

08.22 Diagnose combination valve malfunctions.

08.23 Repair, adjust or replace parking brake, cables and linkage. (ASE)

08.24 Check operation of parking brake indicator light system.

08.25 Check operation of brake stop light system; adjust and service as needed.

08.26 Describe the function and principles of anti-lock brake systems.

08.27 Diagnose poor stopping, pulling or dragging caused by problems in the hydraulic system; determine needed repairs.

08.28 Inspect, test, and replace metering (hold-off), proportioning (balance), pressure differential, and combination valves.

08.29 Inspect, test, replace, and adjust height sensing (load) proportioning valve.

08.30 Fabricate and install brake lines (double flare or ISO types); replace hoses, fittings, and supports, as needed.

08.31 Remove, clean (using proper safety procedures), inspect and measure brake drums; service or replace as needed.

08.32 Remove, rebuild and replace calipers. (ASE)

08.33 Remove and reinstall wheel cylinders.

08.34 Adjust calipers with integrated parking brake system.

08.35 Check parking brake cables and components for wear, rusting, binding and corrosion: clean, lubricate, and replace as needed.

08.36 Check parking brake operation; adjust as needed.

08.37 Inspect the vacuum-type power booster unit for vacuum leaks; inspect the check valve for proper operation; repair or replace parts as needed.

08.38 Inspect, test, and replace components of brake warning light system.

08.39 Inspect, test and service anti-lock brake system (ABS) hydraulic, electrical and mechanical components.

08.40 Diagnose poor stopping, wheel lock-up, pedal feel, pulsation and noise problems caused by the anti-lock brake system (ABS); determine needed repairs.

08.42 Observe anti-lock brake system (ABS) warning light(s) at startup; determine if further diagnosis is needed.

08.43 Diagnose anti-lock brake system (ABS) electronic control(s) and components using self-diagnosis and/or recommended test equipment; determine needed repairs.

08.44 Depressurize integral (high pressure) components of the anti-lock brake system (ABS) following manufacturer's recommended safety procedures.

08.45 Fill and bleed the anti-lock brake system's (ABS) front and rear hydraulic circuits following manufacturer's procedures.

08.46 Perform a fluid pressure (hydraulic boost) diagnosis on the integral (high pressure) anti-lock system (ABS); determine repairs.

08.47 Remove and install anti-lock brake system (ABS) electrical / electronic / hydraulic components following manufacturer's procedures and specifications.

08.48 Service, test, and adjust anti-lock brake system (ABS) speed sensors following manufacturer's recommended procedures.

09.0 DEMONSTRATE PROFICIENCY IN ROUTINE MAINTENANCE AND CONSUMER SERVICES--The student will be able to:

09.01 Identify and interpret vehicle identification number information.

09.02 Perform redelivery preparation and minor auto detailing functions.

09.03 Inspect tires; check and adjust air pressure.

09.04 Identify and describe typical automotive lubricants and lubricant properties.

09.05 Check for proper fluid levels.

09.06 Identify the correct techniques use in "jump starting" vehicles.

09.07 Start a vehicle using jumper cables and a battery or auxiliary power supply.

09.08 Inspect, test, head and tail lamp circuits, aim headlights and replace bulbs.

09.09 Inspect, clean, fill or replace battery.

09.10 Perform slow/fast battery charge.

09.11 Perform oil change and lubricate vehicle.

09.12 Check power steering fluid level (ASE).

09.13 Check electrical circuits using jumper wires; determine needed repairs.

09.14 Inspect coolant condition; drain and recover.

09.15 Clean engines.

09.16 Remove and replace valve cover gaskets (ASE).

09.17 Service positive crankcase ventilation (PVC) system.
09.18 Inspect and clean battery cables, connectors, clamps, and hold-downs; repair or replace as needed.
09.19 Perform battery state-of-charge test; determine needed service.
09.20 Flush power steering system.
09.21 Inspect and test fusible links, circuit breakers, and fuses; replace as needed.
09.22 Check electrical circuits with a test light; determine needed repairs.
09.23 Check manual steering gear fluid level (ASE).
09.24 Dismount, inspect, repair, and remount tire on wheel.
09.25 Reinstall wheel; torque lug nuts.
09.26 Inspect and adjust alternator drive belts; replace as needed.
09.27 Perform tire repairs, tire assembly and wheel balancing.
09.28 Rotate tires according to manufacturer's recommendations.
09.29 Inspect, adjust or replace and adjust power steering pump belt.
09.30 Install audio system components.
09.31 Measure voltage drops, current flow, resistance, open, and short circuits.
09.32 Inspect and test switches, connectors, and wires of electrical/electronic circuits; repair or replace as needed.
09.33 Check radiator coolant level, test and add coolant. (ASE)
09.34 Inspect thermostat and housing; replace as needed.
09.35 Inspect and replace engine cooling and heater system hoses.
09.36 Inspect, test, and replace radiator, pressure cap, and coolant recovery system.
09.37 Identify types and uses of automotive engine oils.
09.38 Inspect exhaust manifold, exhaust pipes, mufflers, resonators, tail pipes, and heat shields; repair or replace as needed.
09.39 Check transmission/trans-axle fluid levels and change fluids and filters.
09.40 Inspect passenger restraint system, repair if needed.
09.41 Maintain or restore electronic memory functions.
09.42 Inspect A/C compressor drive belts; replace and adjust as needed.
09.43 Inspect engine cooling and heater system hoses and belts; replace as needed.
09.44 Inspect coolant; drain, flush, refill, and bleed cooling system with recommended coolant.
09.45 Service exhaust gas recirculation (EGR) systems. (ASE)
09.46 Remove and replace fuel injection system filters.
09.47 Remove and replace speedometer gears and service speedometer cables. (ASE)
09.48 Measure and diagnose the cause(s) of abnormal key-off battery drain; determine needed repairs.

10.0 DEMONSTRATE PROFICIENCY IN THE OPERATION AND SERVICING OF STEERING, SUSPENSION AND WHEEL SYSTEMS--The student will be able to:

10.01 Identify the properties, varieties and use appropriate procedures to store and dispose of fluids, greases and lubricants in steering, and wheel systems.
10.02 Describe fundamentals of rack-and-pinion steering systems.
10.03 Describe fundamentals of power steering systems.
10.04 Identify components and function of steering and suspension systems.
10.05 Identify tire sizes, construction and application.
10.06 Measure wheel, tire, axle, and hub runout; determine needed repairs.
10.07 Identify and use appropriate procedures for inspecting, repairing and replacing tires and wheels. (ASE)
10.08 Identify and use appropriate procedures for rotating and balancing wheels and tires. (ASE)
10.09 Identify and use appropriate procedures for diagnosing wheel/tire vibrations, shimmy and tramp; determine needed repairs.
10.10 Diagnose tire pull (lead) problem; determine corrective actions.
10.11 Identify the function of steering and suspension system components.
10.12 Inspect steering system and diagnose problems. (ASE)
10.13 Identify and use appropriate procedures in repacking wheel bearings and replacing grease seals on non-drive axles/drive axles and spindles. (ASE).
10.14 Identify and describe automotive bearings.
10.15 Remove, inspect, and service or replace front or rear wheel bearings.
10.16 Remove, clean, inspect, repack, and reinstall wheel bearings and replace seals; reinstall hub and adjust wheel bearings.
10.17 Identify and use appropriate procedures for inspecting, testing and replacing shock absorbers and selective ride systems.
10.18 Identify and use appropriate procedures for servicing MacPherson type struts. (ASE)
10.19 Identify use of appropriate steering geometry and suspension geometry to include caster, camber and toe-in and steering axis inclination.
10.20 Identify appropriate procedures for checking alignment (front and rear) and diagnosing problems.
10.21 Identify and use appropriate procedures for measuring, adjusting and/or replacing a torsion bar. (ASE)
10.22 Inspect suspension system and diagnose problems.
10.23 Identify procedures for removal and replacement of power steering pumps. (ASE)
10.24 Identify procedures for removal and replacement of manual/power steering gear assemblies.

10.25 Identify procedures for removal and replacement of spindles and ball joints.

10.26 Identify procedures for removal and replacement of rear suspension parts.

10.27 Describe the principles of ride-height control systems.

10.28 Remove and replace steering dampers and/or steering linkage components. (ASE)

10.29 Identify appropriate procedures for removing and replacing control arms, coil springs and bushings. (ASE)

10.30 Remove, inspect, and replace coil springs and spring insulators.

10.31 Diagnose MacPherson strut suspension noises, body sway, and uneven riding height problems; determine needed repairs.

10.32 Remove, inspect, and replace steering knuckle assemblies.

10.33 Remove, inspect, and replace stabilizer bar bushings, brackets, and links.

10.34 Remove, inspect, and replace ball joints on MacPherson strut suspension systems.

10.35 Remove, inspect, and replace transverse links, control arms, bushings, and mounts.

10.36 Remove, inspect, and replace leaf spring, leaf spring insulators, (silencers), shackles, brackets, bushings, and mounts.

10.37 Remove, inspect, and replace MacPherson strut cartridge or assembly, strut coil spring, and insulators (silencers).

10.38 Check rear wheel thrust angle; determine needed repairs.

10.39 Check for front wheel setback; determine needed repairs.

10.40 Check front cradle (subframe) alignment; determine needed repairs.

10.41 Diagnose vehicle wandering, pulling, hard steering, and poor steering return problems; determine needed repairs.

10.42 Measure vehicle riding height; determine needed repairs.

10.43 Check and adjust front and rear wheel camber (where applicable); determine needed repairs.

10.44 Check and adjust caster (where applicable); determine needed repairs.

10.45 Check and adjust front wheel toe; adjust as needed.

10.46 Center steering wheel.

10.47 Check toe-out-on-turns (turning radius); determine needed repairs.

10.48 Check SAI (steering axis inclination)/KPI (king pin inclination) and included angle; determine needed repairs.

10.49 Check and adjust (where applicable) rear wheel toe.

10.50 Remove, inspect, replace, and adjust suspension system torsion bars; inspect mounts.

10.51 Diagnose steering column noises, looseness, and binding problems (including tilt mechanism), determine needed repairs.

10.52 Diagnose power non-rack and pinion steering gear binding, uneven turning effort, looseness, hard steering, and fluid leakage problems; determine needed repairs.

10.53 Diagnose power rack and pinion steering vibration, looseness, and hard steering problems; determine needed repairs.

10.54 Adjust manual or power non-rack and pinion worm bearing preload and sector lash.

10.55 Remove and replace manual or power rack and pinion steering gear; inspect mounting bushings and brackets.

10.56 Disassemble, inspect, repair, and reassemble rack and pinion steering gear.

10.57 Adjust manual or power rack and pinion steering gear.

10.58 Inspect and replace manual or power rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.

10.59 Inspect manual and power steering fluid levels and condition.

10.60 Diagnose power steering fluid leakage; determine needed repairs.

10.61 Remove, inspect, and replace power steering pump pulley; check alignment.

10.62 Perform power steering system pressure test; determine needed repairs.

10.63 Inspect and replace power steering hoses and fittings.

10.64 Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering leakage damper.

10.65 Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps.

10.66 Diagnose, inspect, adjust, repair or replace components of electronically-controlled steering systems.

10.67 Diagnose short and long arm suspension system noises, body sway and uneven riding height problems; determine needed repairs.

10.68 Remove, inspect, adjust, repair or replace components of electrically-controlled suspension systems.

10.69 Remove, inspect, and replace upper and lower control arms, bushings, shafts and rebound bumpers.

10.70 Remove, inspect, and replace upper and lower ball joints on short and long arm suspension systems.

10.71 Remove, inspect, adjust, repair or replace components of electrically-controlled suspension systems.

11.0 DEMONSTRATE PROFICIENCY IN HEATING, AIR CONDITIONING AND ENGINE COOLING SYSTEMS--The student will be able to:

11.01 Identify the properties, varieties and use appropriate procedures to store and dispose of fluids, greases and lubricants in air conditioning and engine cooling systems.

11.02 Inspect, service and replace drive belts.

11.03 Describe heating and air conditioning principles.

11.04 Diagnose A/C system problems that cause the pressure protection devices to interrupt system operation; repair as needed.

11.05 Apply proper safety procedures used when servicing automotive air conditioning and engine cooling systems.
11.06 Inspect, test, and replace radiator, pressure cap, and coolant recovery system.
11.07 Pressure test cooling systems/radiator caps. (ASE)
11.08 Remove and replace water pumps.
11.09 Describe cooling fan operations and use appropriate test procedures for electrical, mechanical and thermo-hydraulic systems.
11.10 Clean, inspect, and test fan, fan clutch (electrical and mechanical), and fan shroud; replace as needed.
11.11 Diagnose overheating problems.
11.12 Remove heater core, diagnose problems and service control units, cables and replace. (ASE)
11.13 Inspect and test electrical fan control system and circuits.
11.14 Inspect, diagnose, flush and pressure test basic air conditioning system.
11.15 Label and store refrigerant.
11.16 Discharge, evacuate and charge an air conditioning system using refrigerant recovery equipment.
11.17 Identify procedures for removal and replacement of components in an air conditioning system. (ASE)
11.18 Service vacuum circuits.
11.19 Perform engine vacuum tests; determine needed repairs.
11.20 Inspect and test A/C-heater control panel assembly; replace as needed.
11.21 Diagnose the cause of temperature control problems in the heater/ventilation system; determine needed repairs.
11.22 Inspect and test A/C-heater ducts, doors, hoses, and outlets; replace as needed.
11.23 Inspect and test heater control valve(s) (manual, vacuum, and electrical types); replace as needed.
11.24 Test recycled refrigerant for non-condensable gases.
11.25 Verify correct operation of refrigerant handling equipment.
11.26 Identify and recover A/C system refrigerant.
11.27 Diagnose the cause of failures in the vacuum and mechanical controls of the heating and A/C system; determine needed repairs.
11.28 Perform cooling system tests (pressure, combustion leakage, and temperature); determine needed repairs.
11.29 Inspect the condition of discharged oil.
11.30 Select oil type; measure and add oil to A/C system, as needed.
11.31 Perform cooling system tests (pressure, combustion leakage, and temperature); determine needed repairs.
11.32 Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; service or replace as needed.
11.33 Perform cooling system, cap, and recovery system tests (pressure, combustion leakage, and temperature); determine needed repairs.

11.34 Diagnose the cause of failures in the electrical controls of heating and A/C systems; determine needed repairs.

11.35 Diagnose A/C system problems caused by too much moisture in the refrigerant; determine needed repairs.

11.36 Install A/C system filter.

11.37 Remove and inspect A/C system mufflers, hoses, lines, fittings, o-rings, seals, and service valves; replace as needed.

11.38 Inspect A/C condenser for air flow restrictions; service as required.

11.39 Inspect receiver/drier or accumulator/drier; replace as needed.

11.40 Inspect and test expansion valve or orifice (expansion) tube; replace as needed.

11.41 Inspect evaporator housing water drain; repair as needed.

11.42 Inspect coolant; drain, flush, refill, and bleed cooling system with recommended coolant.

11.43 Diagnose the cause of unusual operating noises in the A/C system; determine needed repairs.

11.44 Conduct a performance test of the A/C system (includes pressure gauge readings, visual inspection, and touch procedures); determine needed repairs.

11.45 Test A/C compressor load cut-off systems; determine needed repairs.

11.46 Check operation of automatic and semi-automatic heating, ventilation, and air conditioning (HVAC) control systems; determine needed repairs.

11.47 Leak test A/C system; determine needed repairs.

11.48 Inspect and test A/C compressor clutch components or assembly; replace as needed.

11.49 Inspect A/C drive pulley; replace as needed.

11.50 Remove and replace A/C compressor and mountings.

11.51 Inspect and replace A/C compressor shaft seal assembly(s).

11.52 Inspect and test A/C-heater vacuum control switches, hoses, diaphragms (motors), vacuum reservoir, check valve, and restrictors; replace as needed.

11.53 Inspect, test, and replace radiator, pressure cap, and coolant recovery system.

12.0 DEMONSTRATE PROFICIENCY IN ENGINE THEORY AND REPAIRS--The student will be able to:

12.01 Interpret basic automotive engine theory, components, and functions.

12.02 Identify engine components.

12.03 Check for proper fluid levels.

12.04 Interpret engine lubrication systems.

12.05 Inspect engine assembly for fuel, oil, coolant, and other leaks; determine needed repairs.

12.06 Describe valve train operation.

12.07 Inspect valves; resurface or replace.

12.08 Inspect valve seats; resurface or replace.

12.09 Deglaze and clean cylinder walls.

12.10 Identify procedures for removal and replacement of engine assemblies. (ASE)
12.11 Describe proper procedure for engine disassembly and reassembly. (ASE)
12.12 Describe exhaust system components and functions.
12.13 Remove and replace engine mounts.
12.14 Perform oil pressure tests; determine assess repairs.
12.15 Determine source(s) of oil/coolant loss. (ASE)
12.16 Remove and replace oil pan gasket.
12.17 Remove and replace exhaust gaskets. (ASE)
12.18 Inspect, repair or replace crankshaft vibration damper (harmonic balancer).
12.19 Remove and replace core plugs. (ASE)
12.20 Inspect and replace pans, covers, gaskets, and seals.
12.21 Remove and replace timing chains, belts and gears.
12.22 Remove and replace engine oil pump.
12.23 Measure and inspect oil pumps for proper tolerances.
12.24 Remove and replace intake gaskets. (ASE)
12.25 Remove and replace cylinder head gaskets.
12.26 Inspect cylinder heads for cracks and warpage. (ASE)
12.27 Inspect cylinder blocks for warpage. (ASE)
12.28 Prime engine lubrication system.
12.29 Remove cylinder wall ridges.
12.30 Reinstall cylinder head(s) and gasket(s).
12.31 Check valve face-to-seat contact and valve seat concentricity (runout); service seats and valves as needed.
12.32 Measure and inspect engine components for proper tolerances.
12.33 Inspect, measure, service or replace pistons.
12.34 Inspect, measure, and install piston rings.
12.35 Diagnose the cause of excessive oil consumption, unusual engine exhaust color, odor, and sound; determine needed repairs.
12.36 Diagnose the cause of unusual engine noise or vibration problems; determine needed repairs.
12.37 Inspect auxiliary oil coolers; replace as needed.
12.38 Check valve spring assembled height and valve stem height; service valve and spring assemblies as needed.
12.39 Remove cylinder head(s); inspect cylinder head(s) for cracks; gasket surface areas for warpage and leakage check passage condition.
12.40 Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages; repair or replace.
12.41 Clean cylinder block, oil passages and pistons. Remove and replace pistons and rings.
12.42 Inspect engine block for cracks, passage condition, core and gallery plug condition, and surface warpage; surface block or determine needed repairs.
12.43 Inspect and measure cylinder walls for damage and wear; determine needed repairs.
12.44 Remove engine (front-wheel drive); prepare for tear down.
12.45 Reinstall engine (front-wheel drive).

12.46 Remove engine (rear-wheel drive); prepare for tear down.
12.47 Reinstall engine (rear-wheel drive).
12.48 Inspect hydraulic or mechanical lifters; replace as needed.
12.49 Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; replace as needed.
12.50 Inspect and replace camshaft drives (including gear wear and backlash, sprocket and chain wear, overhead cam drive sprockets, drive belts, belt tension, and tensioners).
12.51 Inspect and measure camshaft journals and lobes.
12.52 Inspect and measure camshaft bearings for damage, out-of-round, and alignment; determine needed repairs.
12.53 Inspect, test, and replace oil temperature and pressure switches and sensors.
12.54 Inspect crankshaft for surface cracks and journal damage; check oil passage condition; measure journals; service crankshaft or determine needed repairs.
12.55 Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems; inspect rod alignment and bearing bore condition.
12.56 Inspect, remove or replace crankshaft pilot bearings or bushings (as applicable.
12.57 Remove and replace turbo-charger.
12.58 Check and adjust turbo-charger waste gates.
12.59 Inspect auxiliary (balance, intermediate, idler, counterbalance or silencer) shaft(s); inspect shafts(s) and support bearings for damage and wear; determine needed repairs; reinstall and time.
12.60 Inspect, replace, and align power train mounts.
12.61 Inspect and measure main and connecting rod bearings for damage, clearance, and end play; determine needed repairs (includes the proper selections of bearings).
12.62 Remove and replace front and rear crankshaft seals.
12.63 Reassemble engine components using correct gaskets and sealants.

13.0 DEMONSTRATE PROFICIENCY IN THE OPERATION AND SERVICING OF MANUAL DRIVE TRAINS AND AXLES--The student will be able to:

13.01 Identify the properties, varieties and use appropriate procedures to store and dispose of fluids, greases and lubricants in manual drive trains.
13.02 Identify and describe typical automotive lubricants and lubricant properties.
13.03 Use proper safety procedures when servicing manual drive train axles.
13.04 Describe basic manual transmission theory and operation.
13.05 Identify drive shaft operations and construction.
13.06 Adjust shift linkage. (ASE)
13.07 Adjust clutch linkage.
13.08 Identify clutch operations.
13.09 Describe the principles of differential operations.
13.10 Demonstrate drive shaft operations, construction and relate assemblies.

13.11 Identify rear axle operations.
13.12 Inspect, service, and replace front-wheel bearings and locking hubs.
13.13 Check four-wheel drive assembly seals and vents; check lube level.
13.14 Describe overdrive theory and operations.
13.15 Diagnose drive line and drive axle problems.
13.16 Inspect, service and performance test manual transmissions.
13.17 Diagnose clutch noise, binding, slippage, pulsation, and chatter problems.
13.18 Adjust trans-axle shifting controls.
13.19 Remove and replace transmission mounts. (ASE)
13.20 Remove and reinstall transmission.
13.21 Inspect and replace speedometer drive gear, driven gear, and retainers.
13.22 Inspect, remove and replace constant-velocity/universal joints.
13.23 Inspect, remove, replace and lubricate front drive axle, flexible joints and boots.
13.24 Service differentials. (ASE)
13.25 Inspect transaxle drive, link chains, sprockets, gears, bearings, and bushings; replace as needed.
13.26 Diagnose rear axle shafts, bearings and seals for noise, vibration, and fluid leakage problems; determine needed repairs.
13.27 Diagnose transmission noise, hard shifting, jumping out of gear, and fluid leakage problems; determine needed repairs.
13.28 Inspect and replace transmission gaskets, seals, and sealants; inspect sealing surfaces.
13.29 Diagnose transaxle noise, hard shifting, jumping out of gear, and fluid leakage problems; determine needed repairs.
13.30 Inspect, adjust or replace clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs.
13.31 Inspect and replace clutch pressure plate assembly and clutch disc.
13.32 Inspect, adjust, repair or replace hydraulic clutch slave and master cylinders, lines, and hoses.
13.33 Inspect engine block, clutch (bell) housing, and transmission case mating surfaces; determine needed repairs.
13.34 Disassemble, clean, and reassemble transmission components.
13.35 Inspect, adjust, and reinstall transmission shift cover, forks, grommets, levers, shafts, sleeves, detent mechanisms, interlocks, and springs.
13.36 Inspect and reinstall input (clutch) shaft and bearings.
13.37 Inspect, replace, and align power train mounts.
13.38 Inspect and reinstall synchronizer hub, sleeve, keys (inserts) springs, and blocking rings.

13.39 Inspect transaxle case, mating surfaces, bores, bushings, and vents.

13.40 Inspect and replace rear axle shaft seals, bearings, and retainers.

13.41 Inspect, adjust or replace release (throw-out) bearing, lever, and pivot.

13.42 Inspect, remove or replace crankshaft pilot bearing or bushing (as applicable).

13.43 Inspect and reinstall reverse idler gear, shaft, bearings, thrust washers, and retainers; check end play; adjust as needed.

13.44 Inspect and replace speedometer drive gear, driven gear, vehicle speed sensor (VSS), and retainers.

13.45 Remove and replace transaxle final drive (as applicable).

13.46 Disassemble and clean transaxle final drive (as applicable).

13.47 Inspect, adjust, and reinstall transaxle shift cover, forks, levers, grommets, shafts, sleeves, detent mechanism, interlocks, and springs.

13.48 Inspect and reinstall input (clutch) shaft and bearings.

13.49 Inspect and reinstall output shaft, gears, thrust washers, bearings, and retainers.

13.50 Measure end play or preload (shim or spacer selection procedure) on transaxle shafts; adjust as needed.

13.51 Inspect and reinstall reverse idler gear, shaft, bearings, thrust washers, and retainers.

13.52 Diagnose constant-velocity (CV) joint noise and vibration problems; determine needed repairs.

13.53 Inspect transaxle drive, link chains, sprockets, gears, bearings, and bushings; replace as needed.

13.54 Diagnose differential assembly noise and vibration problems; determine needed repairs.

13.55 Remove, inspect, measure, adjust, and reinstall differential pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case assembly.

13.56 Diagnose front wheel drive (FWD) front wheel bearing noise and vibration problems; determine needed repairs.

13.57 Inspect, service, and replace shaft center support bearings.

13.58 Disassemble, inspect, measure, and adjust or replace differential pinion gears (spiders), shaft, side gears, side bearings, thrust washers, and case.

13.59 Reassemble and reinstall differential case assembly; measure runout; determine needed repairs.

13.60 Inspect transaxle drive, link chains, sprockets, gears, bearings, and bushings; replace as needed.

13.61 Inspect and reinstall main shaft, gears, thrust washers, bearings, and retainers.

13.62 Inspect ring gear and measure runout; determine needed repairs.

13.63 Remove and inspect drive pinion gear, spacers, sleeves, and bearings.

13.64 Measure and adjust drive pinion depth.

13.65 Measure and adjust drive pinion bearing preload.

13.66 Measure and adjust side bearing preload and ring and pinion gear backlash on a differential carrier assembly (threaded cup and shim types).

13.67 Measure rotating torque; determine needed repairs.

13.68 Remove and replace rear axle shafts and wheel studs.

13.69 Diagnose four-wheel drive assembly noise, vibration, and unusual steering problems; determine needed repairs.

13.70 Inspect, adjust, and repair transfer case shifting controls (mechanical, electrical, and vacuum), bushings, mounts, levers, and brackets.

13.71 Remove and reinstall four-wheel drive transfer case.

13.72 Disassemble, service, and reassemble transfer case and components.

13.73 Inspect, adjust or replace manual shift valve and throttle (TV) linkages or cables (as applicable).

13.74 Remove and replace clutches, release bearings, linkage and pilot bearings. (ASE)

13.75 Remove and replace extension housing seals and bushings. (ASE)

13.76 Inspect, adjust, and reinstall transaxle shift linkages, brackets, bushings, cables, pivots, and levers.

13.77 Remove and replace drive axle bearings and seals.

14.0 DEMONSTRATE PROFICIENCY IN THE OPERATION AND SERVICING OF AUTOMATIC TRANSMISSION/TRANS-AXLE--The student will be able to:

14.01 Service transmission; perform visual inspection; replace fluids and filters.

14.02 Identify and describe typical automotive seals and gaskets.

14.03 Inspect and replace external seals and gaskets.

14.04 Identify the properties, varieties and use appropriate procedures to store and dispose of fluids, greases and lubricants in an automatic transmission/trans-axle.

14.05 Identify and describe typical automotive lubricants and lubricant properties.

14.06 Use proper safety procedures when servicing automatic transmissions.

14.07 Identify automotive shop safety hazards, methods to prevent and deal with accidents.

14.08 Describe the principles of automatic transmission operations including planetary gears, clutches, bands, hydraulic circuits and torque converters.

14.09 Adjust neutral safety switches.

14.10 Remove and replace external gaskets and seals.

14.11 Test shift modulators. (ASE)

14.12 Flush torque converter and transmission cooling system.

14.13 Identify automotive shop safety hazards, methods to prevent and deal with accidents.

14.14 Inspect and diagnose malfunctions of automatic transmissions such as fluid leaks, temperature and slipping.

14.15 Adjust selector shift linkage. (ASE)

14.16 Adjust throttle linkage from the engine.

14.17 Adjust transmission.

14.18 Describe the principles of the computer controlled transmissions.

14.19 Interpret and verify driver's complaint; verify proper engine operation; determine needed repairs.

14.20 Diagnose unusual fluid usage, level, and condition problems; determine needed repairs.

14.21 Inspect, leak test, flush, and replace cooler, lines, and fittings.

14.22 Performance test and service transmission; perform visual inspection: pressure flush, replace fluids and filters.

14.23 Inspect, adjust or replace (as applicable) vacuum modulator; inspect and repair or replace lines and hoses.

14.24 Perform stall tests; determine needed repairs.

14.25 Perform lock-up converter system tests; determine needed repairs.

14.26 Inspect, measure, repair, and replace valve body (includes surfaces and bores, springs, valves, sleeves, retainers, brackets, check-balls, screens, spacers, and gaskets).

14.27 Inspect servo bore, piston, seals, pin, spring, and retainers: repair or replace as needed.

14.28 Inspect accumulator bore, piston, seals, spring, and retainer; repair or replace as needed.

14.29 Inspect, test, adjust, repair or replace transmission related electrical and electronic components (include computers, solenoids, sensors, relays, and switches).

14.30 Inspect, and reinstall transmission and torque converter (rear-wheel drive).

14.31 Remove and reinstall transaxle and torque converter assembly.

14.32 Disassemble, clean, and inspect transmission (rear-wheel drive).

14.33 Disassemble, clean, and inspect transaxle assembly.

14.34 Assemble transmission (rear-wheel drive).

14.35 Assemble transaxle.

14.36 Inspect converter flex plate, attaching parts, pilot and pump drive, and seal areas.

14.37 Measure torque converter end play, and check for interference; check stator clutch.

14.38 Check end play or preload; determine needed service.

14.39 Inspect, measure, and replace thrust washers and bearings.

14.40 Inspect oil delivery seal rings, ring grooves, and sealing surface areas.

14.41 Inspect bushings; replace as needed.

14.42 Inspect and measure planetary gear assembly (includes sun, ring gear, thrust washers, planetary gears, and carrier assembly); replace as needed.

14.43 Inspect cases, bores, passages, bushings, vents, and mating surfaces; replace as needed.

14.44 Inspect, measure, repair, adjust or replace transaxle final drive components.

14.45 Inspect and reinstall parking pawl, shaft, spring, and retainer; replace as needed.

14.46 Remove and replace front pump seal and bushing.

15.0 DEMONSTRATE PROFICIENCY IN DIAGNOSING/TROUBLESHOOTING ELECTRICAL/ELECTRONIC COMPONENTS--The student will be able to:

15.01 Measure properties of a circuit using analog volt-ohm meters, digital volt-ohm meters and oscilloscopes.

15.02 Analyze and measure DC circuits using AVON, DOOM, oscilloscope, frequency counter and function generator.

15.03 Describe automotive battery construction, and use appropriate service and test procedures.

15.04 Describe basic generator/alternator theory, operation and use appropriate test procedures.

15.05 Relate electricity to the nature of matter.

15.06 Identify sources of electricity.

15.07 Define voltage, current, resistance, power and energy.

15.08 Read and interpret schematics, electrical color codes and symbols.

15.09 Perform battery capacity (load, high-rate discharge) test; determine needed service.

15.10 Remove, inspect, and replace/reinstall alternator, and adjust drive belt.

15.11 Inspect and test voltage regulator; replace as needed.

15.12 Examine starting systems and perform starter current draw and circuit voltage drop.

15.13 Solve problems in electronic units using metric prefixes.

15.14 Apply Ohm's Law to series circuits.

15.15 Construct and verify operation of series circuits.

15.16 Analyze and troubleshoot series circuits.

15.17 Describe magnetic properties of circuits and devices.

15.18 Identify properties of an AC signal.

15.19 Identify AC sources.

15.20 Analyze and measure AC signals utilizing AVOM, DVOM, oscilloscope, frequency counter and function generator.

15.21 Describe the characteristics of AC capacitive circuits.

15.22 Describe the characteristics of AC inductive circuits.

15.23 Apply Ohm's Law to parallel circuits.

15.24 Verify the operation of parallel circuits.

15.25 Analyze and troubleshoot parallel circuits.

15.26 Apply Ohm's Law to combination circuits.

15.27 Construct and verify the operation of combination circuits.

15.28 Troubleshoot combination circuits.

15.29 Inspect, repair and replace electrical system switches.

15.30 Describe basic motor theory, operation and use appropriate test procedures.

15.31 Use acceptable soldering and desoldering techniques.

15.32 Make electrical connections.

15.33 Perform starter free-running (bench) tests; determine needed repairs.

15.34 Disassemble, clean, inspect, and test alternator components; replace as needed.

15.35 Remove and replace/reinstall starter.

15.36 Inspect, diagnose, and test the cause of no turn signal or hazard light operation or light with no flash on one or both sides; repair or replace as needed.

15.37 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.

15.38 Find shorts, grounds, opens, and high resistance problems in electrical/electronic circuits; determine needed repairs.

15.39 Determine the physical and electrical characteristics of capacitors and inductors.

15.40 Diagnose, repair, or replace power window, seat, windshield, wiper/washer systems.

15.41 Test and replace sending units.

15.42 Diagnose the cause of brighter than normal, intermittent, dim or no light operation.

15.43 Use wiring diagrams during diagnosis of electrical circuit problems.

15.44 Identify and explain electronic semiconductor, transistor, and microprocessor concepts and components.

15.45 Diagnose engine mechanical, electrical, electronic, fuel, and ignition problems with an ignition oscilloscope and engine analyzer; determine needed action.

15.46 Diagnose charging system problems that cause an undercharge, a no-charge or an overcharge condition.

15.47 Test gauge circuit voltage regulators (limiters); replace as needed.

15.48 Inspect and test starter relays and solenoids; replace as needed.

15.49 Diagnose the cause of intermittent, high, low or no gauge readings.

15.50 Inspect and test gauges and gauge sending units; replace as needed.

15.51 Inspect and test connectors, wires, and printed circuit boards or gauge circuits; repair or replace as needed.

15.52 Diagnose the cause(s) of intermittent, high, low or no readings on electric digital instrument clusters.

15.53 Inspect and test sensors, sending units, connectors, and wires of electronic digital instrument circuits; repair or replace as needed.

15.54 Diagnose the cause of constant, intermittent or no horn(s) operation; repair as needed.

15.55 Diagnose the cause of constant, intermittent or no wiper operation; diagnose the cause of wiper speed control and park problems; repair as needed.

15.56 Diagnose the cause of constant, intermittent or no windshield washer operation; repair as needed.

15.57 Diagnose the cause of slow, intermittent or no operation of motor-driven accessory circuits; repair as needed.

15.58 Diagnose the cause of poor, intermittent or no heated glass operation; repair as needed.

15.59 Diagnose the cause of poor, intermittent or no electric door and hatch/trunk lock operation; repair as needed.

15.60 Diagnose the cause of unregulated, intermittent or no operation of cruise control systems; repair as needed.

15.61 Diagnose the cause(s) and repair of the supplemental restraint system (SRS) warning lights. (Note: Follow manufacturer's safety procedures to prevent accidental deployment.)

16.0 DEMONSTRATE PROFICIENCY IN ENGINE PERFORMANCE SERVICE--The student will be able to:

16.01 Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels and calibration decals).

16.02 Apply proper safety procedures when performing engine performance service.

16.03 Service air cleaners (ASE).

16.04 Service evaporative control system (ASE).

16.05 Service thermostatic air cleaner.

16.06 Describe the exhaust gas recirculation (EGR) systems. (ASE)

16.07 Inspect, remove and replace exhaust system components. (ASE)

16.08 Identify basic electronic ignition system principles, components and functions.

16.09 Inspect and test primary circuits.

16.10 Inspect ant test power and ground circuits and connections; service or replace as needed.

16.11 Clean and adjust chokes. (ASE)

16.12 Inspect and test mechanical and electrical fuel pumps and pump control systems; replace as needed.

16.13 Describe the principles of the air injection system.

16.14 Describe the function of exhaust heat shields.

16.15 Check fuel for contaminants and quality.

16.16 Practice recommended precautions when handling static sensitive devices.

16.17 Remove and replace ignition switch. (ASE)

16.18 Inspect, remove and replace ignition wires, distributor cap and rotor.

16.19 inspect and test distributor; service as needed.

16.20 Remove, gap and replace spark plugs. (ASE)

16.21 Understand basic carburetor type fuel systems.

16.22 Inspect, remove and replace fuel filters. (ASE)

16.23 Identify basic emission control system components and function.

16.24 Diagnose the cause(s) of emissions problems resulting from failure of the positive crankcase ventilation system.

16.25 Diagnose the cause(s) of emissions problems resulting from failure of the idle and deceleration speed control system.

16.26 Service air injection systems. (ASE)

16.27 Analyze engine performance by utilizing manufacturer's diagnostic procedures and equipment.

16.28 Describe the principles of and service electronic fuel injection systems.

16.29 Inspect, remove and replace manifold control valve.

16.30 Describe the chemical combustion process (CO_2, H_2O), including products of incomplete combustion (HC, CO and NO).

16.31 Inspect and test ignition system secondary circuit wiring and components; replace as needed.

16.32 Inspect and test ignition coil(s); replace as needed.

16.33 Inspect and test ignition control module; replace as needed.

16.34 Perform tune-up and adjust to manufacturer specifications.

16.35 Remove and replace fuel lines. (ASE)

16.36 Remove and replace carburetors. (ASE)

16.37 Test and service air inlet temperature control systems. (ASE)

16.38 Diagnose the cause(s) of emissions problems resulting from failure of the air injection or catalytic converter systems.

16.39 Remove and replace air pumps, check valves, lines and hoses.

16.40 Perform cranking vacuum, cylinder balance, compression, and cylinder leakage tests.

16.41 Identify procedures to use an external vacuum source and vacuum gauge to check engine performance.

16.42 Identify computer command control system components and know their functions.

16.43 Describe procedures used for cleaning fuel injectors.

16.44 Describe distributable ignition system components and know their function.

16.45 Clean and adjust choke, set idle speed.

16.46 Test and replace ignition ballast resistors. (ASE)

16.47 Check and adjust (where applicable) ignition system timing and timing advance/retard.

16.48 Remove, clean, and reinstall throttle body; adjust related linkages.

16.49 Service ported fuel injection systems.

16.50 Check/adjust idle speed and fuel mixture where applicable.

16.51 Inspect and test positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; service or replace as needed.

16.52 Inspect fuel tank and fuel cap; inspect and replace fuel lines, fittings, and hoses, remove and replace fuel tanks.

16.53 Read and follow vacuum hose routing schematics.

16.54 Test fuel pump pressure and volume and compare to specifications.

16.55 Remove and replace fuel gage tank units.

16.56 Inspect and test cold enrichment system components; adjust or replace as needed.

16.57 Diagnose the cause of unusual exhaust color, odor, and sound; determine needed action.

16.58 Perform engine absolute (vacuum/boost) manifold pressure tests; determine needed repairs.

16.59 Prepare and inspect vehicle and 4-gas analyzer; obtain exhaust readings.

16.60 Diagnose the causes of emissions problems resulting from failure of computerized engine controls.

16.61 Inspect and test ignition wiring harness and connectors; replace as needed.

16.62 Inspect and test ignition system pick-up sensor or triggering devices; replace as needed.

16.63 Diagnose the cause(s) of emissions problems resulting from failure of the spark timing control system.

16.64 Inspect and test circuits of spark timing control systems; replace as needed.

16.65 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.

16.66 Remove, inspect, and test vacuum and electrical components and connections of fuel system; repair or replace as needed.

16.67 Inspect and test fuel pressure regulation system and components of injection type fuel systems; adjust or replace as needed.

16.68 Inspect fuel tank and fuel cap; inspect and replace fuel lines, fittings, and hoses, remove and replace fuel tanks.

16.69 Inspect and test wiring, hoses, and components of idle speed control systems; adjust or replace as needed.

16.70 Inspect and test electrical components, circuits, vacuum components, and hoses of deceleration controls; adjust or replace as needed.

16.71 Inspect and test components and hoses of evaporative emissions control systems; replace as needed.

16.72 Inspect and test mechanical components of air injection systems; service or replace as needed.

16.73 Inspect and test electrical/electronically-operated components and circuits of air injection systems; replace as needed.

16.74 Inspect and test components of catalytic converter systems; replace as needed.

16.75 Diagnose the cause(s) of emissions problems resulting from failure of the intake air temperature control systems.

16.76 Inspect and test components of inlet air temperature control systems; replace as needed.

16.77 Diagnose the cause(s) of emissions problems resulting from failure of early fuel evaporation control systems.

16.78 Inspect and test components of early fuel evaporation control systems; service or replace as needed.

16.79 Diagnose the cause(s) of emissions problems resulting from failure of evaporative emissions control system.

16.80 Diagnose the cause(s) of emissions problems caused by failure of the exhaust gas recirculation (EGR) system.

16.81 Inspect and test valve, valve manifold, and exhaust passages of exhaust gas recirculation (EGR) systems; service or replace as needed.

16.82 Inspect and test vacuum/pressure controls, filters, and hoses of exhaust gas recirculation (EGR) systems; service or replace as needed.

16.83 Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; repair or replace as needed.

16.84 Diagnose no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor mileage, and emissions problems on vehicles with electronic ignition (distributorless) systems; determine needed repairs.

16.85 Diagnose no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor mileage, and emissions problems on vehicles with electronic distributor ignition systems; determine needed repairs.

16.86 Verify correct camshaft timing; determine needed action.

16.87 Verify engine operating temperature; determine needed action.

16.88 Inspect engine assembly for fuel, oil, coolant, and other leaks; determine needed repairs.

16.89 Perform cylinder power balance test; determine needed action.

16.90 Perform cylinder compression test; determine needed action.

16.91 Perform cylinder leakage test; determine needed action.

16.92 Diagnose engine mechanical, electrical, electronic, fuel, and ignition problems with an ignition oscilloscope and engine analyzer; determine needed action.

16.93 Inspect and test sensors, controls, and actuator components and circuits of computerized engine control systems; adjust or replace as needed.

16.94 Perform analytic/diagnostic procedures on vehicles with on-board diagnostic computer systems; determine needed action.

16.95 Inspect throttle body mounting plates, air induction and filtration system, intake manifold and gasket; clean or replace as needed.

16.96 Inspect and test fuel injectors; clean or replace as needed.

16.97 Remove and replace fuel pumps, to include mechanical and in-tank electrical. (ASE)

16.98 Check the performance of engines equipped with on-board computers using appropriate scan tools.

16.99 Diagnose engine mechanical, electrical, electronic, fuel, and ignition problems with an ignition oscilloscope and engine analyzer; determine needed action.

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July 1997

FLORIDA DEPARTMENT OF EDUCATION
CURRICULUM FRAMEWORK

Program Title:	Automotive Upholstery and Trim
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	One program, four completion points
	PSAV
Program Number:	I480313
CIP Number:	0648.030301
Grade Level:	30, 31
Length:	1800 Hours
VSO:	VICA
Coop Method:	Yes
Apprenticeship:	No
Facility Code:	245
Certification:	Auto Uph @7 G

Basic Skills Grade Level

Math	7
Language	7
Reading	7

I.. **PURPOSE:** The purpose of this program is to prepare students for employment in the automobile upholstery industry or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, operating sewing machines, installing carpeting and lining, upholstering door panels, arm rests, seats and accessories, installing headliners an accessories, fitting tonneau covers, installing convertible top and vinyl tops, customizing vehicles and performing shop management functions.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the automotive upholstery and trim industry; planning, management, finance, technical and production skills, underlying principles of technology labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in sewing, design and layout, using sop and cutting tools, fabricating and installing seat covers, trim and tops, and sales consultant skills.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational

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Student Organizations, when provided, shall be in integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: A training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills, and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 7.0, Language 7.0, Reading 7.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643 F.S.

IV. **PROGRAM STUCTURE**: This program is a planned sequence of instruction consisting of four occupational completion points. The recommended sequence allows students to complete specific portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training program or terminate as a occupational completer.

The following diagram illustrates the program structure:

AUTOMOTIVE UPHOLSTERY AND TRIM PROGRAM

OCP D - 390 HOURS
AUTOMOBILE UPHOLSTERER
DOT 780.381-010

OCP C - 360 HOURS
HEADLINER - DOOR PANEL INSTALLER
INDUSTRY

OCP B - 600 HOURS
AUTOMOBILE SEAT COVER AND CONVERTIBLE TOP INSTALLER
DOT 780.384-010

OCP A - 450 HOURS
AUTOMOBILE UPHOLSTERY HELPER
INDUSTRY

V. **INTENDED OUTCOMES**: After successfully completing appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Automobile Upholstery Helper - Industry Title

01. Apply basic upholstery and trim skills. (01.01 through 01.09)
07. Re-upholster seats. (07.01, 07.05, 07.07, 07.09)
13. Demonstrate appropriate communication skills. (13.01)
14. Demonstrate appropriate math skills. (14.03)
15. Demonstrate appropriate understanding of basic science. (15.03)
16. Demonstrate employability skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Automobile Seat Cover and Convertible Top Installer - DOT 780.384-010

02. Install automotive carpet.
03. Install trunk lining.
07. Re-upholster seats. (07.02, 07.03, 07.04, 07.06, 07.08)
08. Fabricate and fit tonneau covers.
09. Remove and install convertible top.
10. Remove and install vinyl/landau tops.
13. Demonstrate appropriate communication skills. (13.02, 13.03)
14. Demonstrate appropriate math skills. (14.01, 14.02)
15. Demonstrate appropriate understanding of basic science. (15.01, 15.04)

OCCUPATIONAL COPLETION POINT - DATA CODE C
Headliner Door Panel Installer - Industry Title

04. Re-upholster door panels and arm rests.
05. Remove and install headliners and accessories.
06. Repair, re-pad and re-upholster dashboard.
13. Demonstrate appropriate communication skills. (13.04)
15. Demonstrate appropriate understanding of basic science. (15.02)

OCCUPATIONAL COMPLETION POINT - DATA CODE D
Automobile Upholsterer - DOT 708.381-010

01. Apply basic upholstery and trim skills. (01.10, 01.11)
11. Customize vehicles.
12. Perform basic management skills
13. Demonstrate appropriate communication skills. (13.05, 13.06)
14. Demonstrate appropriate math skills. (14.04, 14.05)
17. Demonstrate an understanding of entrepreneurship

FLORIDA DEPARTMENT OF EDUCATION
STUDENT PERFORMANCE STANDARDS

Program Title: Automotive Upholstery and Trim
Postsecondary Number: I480313

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Automobile Upholstery Helper - Industry Title

01.0 APPLY BASIC UPHOLSTERY AND TRIM SKILLS--The student will be able to:

01.01 Apply communication and leadership techniques.
01.02 Apply human relation skills.
01.03 Identify safety procedures
01.04 Apply measuring skills.
01.05 Identify shop tool and equipment
01.06 Identify shop supplies and hardware.
01.07 Identify procedures for operating walking foot machine.
01.08 Apply basic sewing techniques.
01.09 Apply advanced sewing techniques.

07.0 RE-UPHOLSTER SEATS--The student will be able to:

07.01 Remove seat unit.
07.05 Install seats.
07.07 Install backrest trim.
07.09 Install ready-made seat covers.

13.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

13.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.

14.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

14.03 Add, subtract, multiply, and divide using fractions, decimals, and whole numbers.

15.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

15.03 Identify health related problems that may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Identify documents that may be required when applying for a job.
16.04 Complete a job application form correctly.

16.05 Demonstrate competence in job interview techniques.
16.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other employees.
16.07 Identify acceptable work habits.
16.08 Demonstrate knowledge of how to make appropriate job changes.
16.09 Demonstrate acceptable employee health habits
16.10 Demonstrate a knowledge of the Florida "Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Automobile seat cover and convertible top installer - DOT 780.384-010

02.0 **INSTALL AUTOMOTIVE CARPET**--The student will be able to:

02.01 Select carpet.
02.02 Install carpet in automobiles/trucks.
02.03 Install carpet in vans.
02.04 Install carpet in imported/sports cars.

03.0 **INSTALL TRUNK LINING**--The student will be able to:

03.01 Install trunk lining.
03.02 Install trunk carpet.

07.0 **RE-UIPHOLSTER SEATS**--The student will be able to:

07.02 Repair frame unit.
07.03 Re-upholster seat.
07.04 Re-upholster head rest.
07.06 Install seats in sports cars.
07.08 Install seats with backrest.

08.0 **FABRICATE AND FIT TONNEAU COVERS**--The student will be able to:

08.01 Select tonneau covering.
08.02 Fabricate tonneau covers.
08.03 Fit tonneau covers.

09.0 **REMOVE AND INSTALL CONVERTIBLE TOP**--The student will be able to:

09.01 Select convertible top.
09.02 Remove convertible top.
09.03 Install convertible top.
09.04 Install rear window unit.
09.05 Fabricate and install convertible well.
09.06 Install top pad.
09.07 Fabricate and install convertible boot.

10.0 **REMOVE AND INSTALL VINYL/LANDAU TOPS**--The studert will be able to:

10.01 Identify types of vinyl/landau installations.
10.02 Select vinyl/landau top covers.
10.03 Remove vinyl/landau top.
10.04 install vinyl/landau top.

13.0 **DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS**--The student will be able to:

13.02 Read and understand graphs, charts. diagrams., and tables commonly used in this industry/occupation area.
13.03 Read and follow written and oral instructions.

14.0 **DEMONSTRATE APPROPRIATE MATH SKILLS**--The student will be able to:

14.01 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
14.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

15.0 **DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE**--The student will be able to:

15.01 Understand molecular actions as a result of temperature extremes, chemical reaction, and moisture content.
15.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
Headliner - Door Panel Installer- Industry Title

04.0 **RE-UPHOLSTER DOOR PANELS AND ARM RESTS**--The student will be able to:

04.01 Remove door panes.
04.02 Re-upholster arm rests.
04.03 Identify door panels and accessories.
04.04 Upholster door panels.
04.05 Install door panels.

05.0 **REMOVE AND INSTALL HEADLINERS AND ACCESSORIES**--The student will be able to:

05.01 Remove headliners and accessories.
05.02 Install molded headliners and accessories.

06.0 **REPAIR, RE-PAD AND RE-UPHOLSTER DASHBOARD**--The student will be able to:

06.01 Repair dashboard.
06.02 Re-pad dashboard.
06.03 Re-upholster dashboard.

13.0 **DEMONSTRAE APPROPRIATE COMMUNICATION SKILLS**--The student will be able to:

13.04 Answer and ask questions coherently and concisely.

15.0 **DEMONSTRATE APPROPRIATE UNDERSTANDING OF BSIC SCIENCE**--The student will be able to:

15.02 Draw conclusions or make inferences from data.

OCCUPATIONAL COMPLETION POINT - DATA CODE D
Automobile Upholsterer - DOT 780.381-010

01.0 **APPLY BASIC UPHOLSTERY AND TRIM SKILLS**--The student will be able to:

01.10 Select design and type of fabric.
01.11 Perform detailing skills.

11.0 **CUSTOMIZING VEHICLES**--The student will be able to:

11.01 Customize seats.
11.02 Customize carpet.
11.03 Customize headliner.
11.04 Customize panel.
11.05 Customize dashboard.
11.06 Customize package tray.
11.07 Customize convertible top and accessories.
11.08 Customize exterior.
11.09 Customize car cover.
11.10 Customize tire covers.
11.11 Customize miscellaneous body parts.
11.12 Install sun/T-top.

12.0 **PERFORM BUSINESS MANAGEMENT SKILLS**--The student will be able to:

12.01 Perform sales consulting duties.
12.02 Estimate job costs.
12.03 Perform business practices.
12.04 Use sample fabric/material books.

13.0 **DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS**--The student will be able to:

13.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
13.06 Demonstrate appropriate telephone communication skills.

14.0 **DEMONSTRATE APPROPRIATE MATH SKILLS**--The student will be able to:

14.04 Determine the correct purchase price, to include sales tax, for a materials list containing a minimum of six items.
14.05 Demonstrate an understanding of federal, state, and local taxes and the computation.

17.0 **DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP**--The student will be able to:

17.01 Define entrepreneurship.
17.02 Describe the importance of entrepreneurship to the American economy.
17.03 List the advantages and the disadvantages of business ownership

17.04 Identify the risks involved in ownership of a business.

17.05 Identify the necessary personal characteristics of a successful entrepreneur.

17.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Autotronics
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I470614**
CIP Number	0647.060401
Grade Level	30, 31
Length	1800 hours
Certification	ELECTRONIC @7 G
	AUTO MECH @7 G
	AUTO ELECT G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for initial employment as autotronics technicians (620.261-010). This program also provides supplemental training for persons previously or currently employed in this occupations.

This program includes selected competencies of the common core electronics program and others uniquely automotive.

The course content will include the following: direct current (DC); alternating current (AC), analog, relay, delay and time delay circuits; solid-state and digital devices, distribution, timing and control systems; microprocessors; industrial power supplies; transformers; DC and AC motors; digital motor controls; manual controllers; magnetic controllers and starters; pressure and strain measurements; temperature, photoelectric liquid level a process control; line diagrams and logic functions; gas and humidity sensing; and telemetry. The course content should also include training in communication skills, leadership skills, human relations and employability skills, and safe efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Autotronics industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students will use various types of precision test equipment for analyzing, troubleshooting and repairing computer circuitry.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such

organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; and a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

Algebra is recommended as a prerequisite for entry into this program.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 10.0, Language 9.0, Reading 10.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

The typical length of this program for the average achieving student including the core is 1800 hours. This program provides the specialized technical content for the Automotive Service Management Technology (Autotronics Endorsement).

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate a working knowledge of laboratory practices.
02.0 Demonstrate a working knowledge of direct current circuits.
03.0 Demonstrate a working knowledge of alternating current circuits.
04.0 Demonstrate a working knowledge of dual trace oscilloscopes.
05.0 Demonstrate a working knowledge of semi-conductor devices.
06.0 Demonstrate a working knowledge of integrated circuits.
07.0 Demonstrate a working knowledge of digital circuits.
08.0 Demonstrate a working knowledge of microprocessor fundamentals.
09.0 Demonstrate a working knowledge of electronic engine controls.
10.0 Demonstrate a working knowledge of electronic control module input and output devices and their functions.
11.0 Demonstrate a working knowledge of troubleshooting electronic control module systems.
12.0 Demonstrate a working knowledge of system operation.
13.0 Demonstrate a working knowledge of system input devices.
14.0 Demonstrate a working knowledge of system output devices.
15.0 Demonstrate a working knowledge of system diagnosis and repair.
16.0 Demonstrate a working knowledge of computer output displays.
17.0 Demonstrate a working knowledge of electronic instrumentation systems.
18.0 Demonstrate a working knowledge of theft deterrent systems.
19.0 Demonstrate a working knowledge of trip computer and trip monitor systems.
20.0 Demonstrate a working knowledge of windshield wiper and washer systems.

21.0 Demonstrate a working knowledge of cruise control systems.
22.0 Demonstrate a working knowledge of voice alert systems.
23.0 Demonstrate a working knowledge of audio systems.
24.0 Demonstrate a working knowledge of guide-matic and twilight sentinel systems.
25.0 Demonstrate a working knowledge of climate control systems.
26.0 Demonstrate a working knowledge of electronic seats with memory.
27.0 Demonstrate a working knowledge of fiber optics.
28.0 Demonstrate a working knowledge of automatic brake systems operation.
29.0 Demonstrate a working knowledge of anti-lock brake system diagnosis and repair.
30.0 Demonstrate a working knowledge of electronic level control systems.
31.0 Demonstrate a working knowledge of electronic steering systems.
32.0 Demonstrate a working knowledge of electronically controlled charging systems.
33.0 Demonstrate a working knowledge of driveability lab.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Autotronics
Secondary Number:
Postsecondary Number: I470614

01.0 DEMONSTRATE A WORKING KNOWLEDGE OF LABORATORY PRACTICES--The student will be able to:

- 01.01 Apply proper Occupational Safety Health Administration safety standards.
- 01.02 Make electrical connections.
- 01.03 Identify and use hand tools properly.
- 01.04 Identify and use power tools properly.
- 01.05 Demonstrate acceptable soldering and desoldering techniques.
- 01.06 Identify components of computer system consisting of central processing unit, monitor, keyboard, data storage devices and peripherals.
- 01.07 Initialize computer and operate keyboard.

02.0 DEMONSTRATE A WORKING KNOWLEDGE OF DIRECT CURRENT CIRCUITS--The student will be able to:

- 02.01 Solve problems in electronic units utilizing metric prefixes.
- 02.02 Relate electricity to the nature of matter.
- 02.03 Identify sources of electricity.
- 02.04 Define voltage, current, resistance, power and energy.
- 02.05 Read and interpret color codes and symbols to identify electrical components and values.
- 02.06 Measure properties of a circuit using volt-ohm meter and digital volt-ohm meter meters and oscilloscopes.
- 02.07 Apply Ohm's law to series circuits.
- 02.08 Construct and verify operation of series circuits.
- 02.09 Analyze and troubleshoot series circuits.
- 02.10 Apply Ohm's law to parallel circuits.
- 02.11 Verify the operation of parallel circuits.
- 02.12 Analyze and troubleshoot parallel circuits.
- 02.13 Apply Ohm's law to parallel circuits.
- 02.14 Construct and verify the operation of combination circuits.
- 02.15 Troubleshoot combination circuits.
- 02.16 Describe magnetic properties of circuits and devices.
- 02.17 Determine the physical and electrical characteristics of capacitors and inductors.

03.0 DEMONSTRATE A WORKING KNOWLEDGE OF ALTERNATING CURRENT (AC) CIRCUITS--The student will be able to:

- 03.01 Identify properties of an AC signal.
- 03.02 Identify AC sources.
- 03.03 Analyze and measure AC signals utilizing VOM, DVM, oscilloscope, frequency counter and function generator.
- 03.04 Define the characteristics of AC capacitive circuits.

03.05 Define the characteristics of AC inductive circuits.
03.06 Define basic motor theory and operation.
03.07 Define basic generator theory and operation.

04.0 DEMONSTRATE A WORKING KNOWLEDGE OF DUAL TRACE OSCILLOSCOPES--The student will be able to:

04.01 Demonstrate proper operation and use of dual trace oscilloscope.

05.0 DEMONSTRATE A WORKING KNOWLEDGE OF SEMI-CONDUCTOR DEVICES--The student will be able to:

05.01 Overview of semi-conductor materials.
05.02 List types of diodes.
05.03 Explain application operation and characteristics of diodes.
05.04 explain construction,applications and use of silicon controlled rectifiers.
05.05 Describe transistor construction.
05.06 Explain characteristics of PNP/NPN transistors.
05.07 Measure current flow and calculate amplifier gain.
05.08 Explain construction and use of Darlington pair.
05.09 Explain concept of open collector operation.
05.10 Identify and define operating characteristics and applications of junction diodes.
05.11 Construct, analyze and troubleshoot diode circuits (basic breadboard).
05.12 Identify and define operating characteristics and applications of bipolar transistors.
05.13 Identify and define operating characteristics and applications of field effect transistors.
05.14 Identify and define operating characteristics and applications of single-stage amplifiers.
05.15 Construct, analyze and troubleshoot single-stage amplifiers.

06.0 DEMONSTRATE A WORKING KNOWLEDGE OF INTEGRATED CIRCUITS--The student will be able to:

06.01 Identify and define operating characteristics and applications of linear integrated circuits.
06.02 Construct linear integrated circuits.
06.03 Analyze and troubleshoot linear integrated circuits.
06.04 Identify and define operating characteristics and applications of power supply regulator circuits.
06.05 Explain positive logic concepts.
06.06 Explain Schmidt trigger concept.
06.07 Explain invertor concepts.
06.08 Explain logic gates.
06.09 Explain quad driver and its use.
06.10 Analyze and troubleshoot power supply regulator circuits.
06.11 Identify and define operating characteristics and applications of opto-electronic devices.

06.12 Set up and operate measuring instruments for analog circuits and computer's diagnosis of auto system (emphasis volt meter).

07.0 DEMONSTRATE A WORKING KNOWLEDGE OF DIGITAL CIRCUITS--The student will be able to:

07.01 Set up and operate logic probes for digital circuits.
07.02 Identify types of logic gates and their truth tables.
07.03 Construct combinational logic circuits using integrated circuits.
07.04 Analyze types of flip-flops and their truth tables.
07.05 Troubleshoot flip-flops.
07.06 Identify, define and measure characteristics of integrated circuit (IC) logic families.
07.07 Identify types of registers and counters.
07.08 Identify types of memory circuits.
07.09 Relate the uses of digital-to-analog and analog-to-digital conversions.
07.10 Troubleshoot digital-to-analog and analog-to digital circuits.
07.11 Identify types of digital displays.
07.12 Construct digital display circuits.
07.13 Troubleshoot digital display circuits.

08.0 DEMONSTRATE A WORKING KNOWLEDGE OF MICROPROCESSOR FUNDAMENTALS--The student will be able to:

08.01 Explain fundamentals of microprocessor operation.
08.02 Analyze and measure properties of analog and digital signals utilizing VOM, DVM and oscilloscope.
08.03 Describe differences between analog and digital signals.
08.04 Explain type of memory(s).
08.05 Explain central processing unit operation.
08.06 Describe function of clock generator.
08.07 Explain function of analog to digital and digital to analog convertors (interface).
08.08 Explain binary code.
08.09 Explain pulse width modulation (duty cycle).
08.10 Explain sensor information processing.
08.11 Explain serial/parallel data processing.
08.12 Describe function of multiplexing.

09.0 DEMONSTRATE A WORKING KNOWLEDGE OF ELECTRONIC ENGINE CONTROLS--The student will be able to:

09.01 Describe stoichiometric air/fuel ratio.
09.02 Describe computer control of air fuel ratio using concept of open loop/closed loop.
09.03 Describe adaptive memory, integrator, block learn.
09.04 Describe effect of air/fuel ratio, timing and exhaust gas recirculating system operation.
09.05 Describe function of three-way catalyst.
09.06 Describe methods of controlling air/fuel ratio.

10.0 DEMONSTRATE A WORKING KNOWLEDGE OF ELECTRONIC CONTROL MODULE INPUT AND OUTPUT DEVICES AND THEIR FUNCTIONS--The student will be able to:

10.01 Demonstrate an understanding of the operation and use of dual trace oscilloscope.
10.02 Describe temperature sensor operation.
10.03 Describe manifold and barometric sensors operation.
10.04 Describe exhaust gas oxygen sensor operation.
10.05 Describe switch and timer circuit operation.
10.06 Explain construction and operation of Hall effect switch.
10.07 Perform testing of Hall effect switches.
10.08 Describe engine speed sensor operation.
10.09 Describe vehicle speed sensor(s) operation.
10.10 Describe throttle position sensor operation.
10.11 Perform testing of electronic timing controls including knock sensor.
10.12 Utilize oscilloscope to test pick-up coil, Hall-effect switch, EST circuits, reference circuits.
10.13 Describe detonation control (electronic spark control).
10.14 Demonstrate an understanding of electronic spark timing operation.
10.15 Describe mass airflow sensor operation.
10.16 Describe electronic control module control of fuel evaporative system.
10.17 Describe crankshaft position sensor operation.
10.18 Describe electronic control module control of air-management system.
10.19 Describe electronic control module control of early fuel evaporation (EFE).
10.20 Describe electronic control module control of spark timing.
10.21 Describe electronic control module control of carbureated fuel mixture.
10.22 Describe type of fuel injection systems.
10.23 Describe components of throttle-body injection systems.
10.24 Describe components of port fuel injection systems.

11.0 DEMONSTRATE A WORKING KNOWLEDGE OF TROUBLESHOOTING ELECTRONIC CONTROL MODULE SYSTEMS--The student will be able to:

11.01 Describe procedures for troubleshooting electronic control module systems.
11.02 Describe type and use of trouble code(s).
11.03 Demonstrate use of generic and manufacturers' test equipment.
11.04 Describe difference between hard failure/soft failure.
11.05 Perform trouble code retrieval procedures.
11.06 Perform pin-out check on electronic control module input and output devices.
11.07 Remove/replace electronic control module/calibration unit.
11.08 Demonstrate ability to troubleshoot electronic control module systems utilizing manufacturers' diagnostic charts.
11.09 Demonstrate general knowledge of electronic systems for major imports.

12.0 DEMONSTRATE A WORKING KNOWLEDGE OF SYSTEM OPERATION--The student will be able to:

12.01 Explain the operation of computer shifted automatic transmission systems.
12.02 Explain viscous converter clutch.
12.03 Describe control module's effect on shifting patterns.
12.04 Explain the function and operation of engine load sensors.

13.0 DEMONSTRATE A WORKING KNOWLEDGE OF SYSTEM INPUT DEVICES--The student will be able to:

13.01 Explain neutral safety/backup light switch.
13.02 Explain throttle position sensor (potentiometer).
13.03 Explain vehicle speed sensor.
13.04 Explain function of brake release switch.
13.05 Explain engine coolant temperature sensor.
13.06 Explain function of air conditioning pressure switches.
13.07 Explain cold inhibit switch.
13.08 Explain operation of vacuum switches.
13.09 Explain thermal vacuum valve.
13.10 Explain vacuum regulator valve.
13.11 Explain vehicle speed sensor tripper module.

14.0 DEMONSTRATE A WORKING KNOWLEDGE OF SYSTEM OUTPUT DEVICES--The student will be able to:

14.01 Explain operation of valve body/solenoid valve.
14.02 Explain function of gear switches.
14.03 Explain torque converter clutch apply valve.
14.04 Explain torque converter clutch delay valve.
14.05 Explain engine coolant fan temperature switch.
14.06 Explain governor pressure control switch.
14.07 Explain function of pulse relay.

15.0 DEMONSTRATE A WORKING KNOWLEDGE OF SYSTEM DIAGNOSIS AND REPAIR--The student will be able to:

15.01 Describe system check.
15.02 Diagnose and differentiate between mechanical and electrical problems.
15.03 Diagnose shifting problems related to engine performance.
15.04 Identify driver habits effecting engine/transmission related diagnosis.
15.05 Describe stored code removal.

16.0 DEMONSTRATE A WORKING KNOWLEDGE OF COMPUTER OUTPUT DISPLAYS--The student will be able to:

16.01 Describe, diagnose and repair service engine lights/emission lights.
16.02 Describe, diagnose and replace liquid crystal displays.
16.03 Describe, diagnose and replace vacuum tube fluorescent displays.

16.04 Describe, diagnose and repair/replace electronic speedometer system.
16.05 Describe, diagnose, and replace quartz-electric cluster.
16.06 Describe, diagnose and replace digital cluster.
16.07 Describe, diagnose and repair/replace odometer.

17.0 DEMONSTRATE A WORKING KNOWLEDGE OF ELECTRONIC INSTRUMENTATION SYSTEMS--The student will be able to:

17.01 Explain electronic instrumentation.
17.02 Diagnose and replace light emitting diode.

18.0 DEMONSTRATE A WORKING KNOWLEDGE OF THEFT DETERRENT SYSTEMS--The student will be able to:

18.01 Describe theft deterrent system operation.
18.02 Diagnose and repair the theft deterrent system

19.0 DEMONSTRATE A WORKING KNOWLEDGE OF TRIP COMPUTER AND TRIP MONITOR SYSTEMS--The student will be able to:

19.01 Describe trip computer and trip monitor operations.
19.02 Diagnose and repair trip computer and trip monitor.

20.0 DEMONSTRATE A WORKING KNOWLEDGE OF WINDSHIELD WIPER AND WASHER SYSTEMS--The student will be able to:

20.01 Describe windshield wiper and washer system operation.
20.02 Diagnose and repair trip computer and trip monitor.

21.0 DEMONSTRATE A WORKING KNOWLEDGE OF CRUISE CONTROL SYSTEMS--The student will be able to:

21.01 Describe cruise control operation.
21.02 Diagnose and repair cruise control system.

22.0 DEMONSTRATE A WORKING KNOWLEDGE OF VOICE ALERT SYSTEMS--The student will be able to:

22.01 Describe voice alert system operation.
22.02 Diagnose and replace audio system components.
22.03 Perform on-car adjustment of audio system.

23.0 DEMONSTRATE A WORKING KNOWLEDGE OF AUDIO SYSTEMS--The student will be able to:

23.01 Describe radio system operation.
23.02 Diagnose and replace audio system components.
23.03 Perform on-car adjustments of audio system.

24.0 DEMONSTRATE A WORKING KNOWLEDGE OF GUIDE-MATIC AND TWILIGHT SENTINEL SYSTEMS--The student will be able to:

24.01 Describe the dimmer system operation.

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24.02 Diagnose and repair guide-matic and twilight sentinel systems.
24.03 Perform on-car adjustment of guide-matic and twilight sentinel systems.

25.0 DEMONSTRATE A WORKING KNOWLEDGE OF CLIMATE CONTROL SYSTEMS--The student will be able to:

25.01 Describe operation of climate control systems.
25.02 Diagnose and repair electronic system.
25.03 Perform on car adjustment of system

26.0 DEMONSTRATE A WORKING KNOWLEDGE OF ELECTRONIC SEATS WITH MEMORY--The student will be able to:

26.01 Describe operation of memory system.
26.02 Diagnose and repair electronic seats.
26.03 Perform on-car adjustment of system.

27.0 DEMONSTRATE A WORKING KNOWLEDGE OF FIBER OPTICS--The student will be able to:

27.01 Theory of fiber optics.
27.02 Application of fiber optics.
27.03 Describe and identify fiber optic systems.
27.04 Diagnose and repair fiber optic systems.

28.0 DEMONSTRATE A WORKING KNOWLEDGE OF AUTOMATIC BRAKE SYSTEMS OPERATION--The student will be able to:

28.01 Describe two-wheel and four-wheel anti-lock brake systems.
28.02 Identify anti-lock brake system components, electrical circuits and controls.
28.03 Explain brake modulation.
28.04 Explain built-in diagnosis on anti-lock brake system control module.
28.05 Explain use and location of skid control sensor.
28.06 Describe, diagnose and replace control module, if equipped.

29.0 DEMONSTRATE A WORKING KNOWLEDGE OF ANTI-LOCK BRAKE SYSTEM DIAGNOSIS AND REPAIR--The student will be able to:

29.01 Perform basic diagnosis and testing using manufacturers' test equipment.
29.02 Diagnose problems with master cylinder, hydraulic booster, electric pump accumulator and valve body assembly.
29.03 Diagnose problems with fluid level warning switches.
29.04 Test electronic wheel sensors.
29.05 Perform system self diagnostic test.
29.06 Perform trouble code diagnostic procedures using manufacturers' diagnostic charts.
29.07 Perform pin-out checks.
29.08 Describe, diagnose and replace control module if equipped.

30.0 DEMONSTRATE A WORKING KNOWLEDGE OF ELECTRONIC LEVEL CONTROL SYSTEMS--The student will be able to:

30.01 Describe operation of electronic leveling control system.
30.02 Demonstrate the correct vehicle raising and lowering operation.
30.03 Explain the air replenishment system.
30.04 Describe a height adjuster sensor.
30.05 Perform diagnostic procedures using manufacturers' diagnostic charts.
30.06 Perform electrical circuit diagnosis.
30.07 Test system for correct performance.
30.08 Test compressor operation.
30.09 Test height sensor operation.
30.10 Test compressor current draw.
30.11 Test residual pressure.
30.12 Test system for air leaks.
30.13 Describe, diagnose and replace control module if equipped.

31.0 DEMONSTRATE A WORKING KNOWLEDGE OF ELECTRONIC STEERING SYSTEMS--The student will be able to:

31.01 System operation.
31.02 System diagnosis and repair.

32.0 DEMONSTRATE A WORKING KNOWLEDGE OF ELECTRONICALLY CONTROLLED CHARGING SYSTEM--The student will be able to:

32.01 System operation.
32.02 System diagnosis and repair.

33.0 DEMONSTRATE A WORKING KNOWLEDGE OF DRIVEABILITY LAB--The student will be able to:

33.01 Demonstrate a knowledge of current technology in electronic engine control systems.
33.02 Interpret vehicle identification numbers.
33.03 Perform comprehensive engine performance analysis using oscilloscope and other appropriate equipment.

33.04 Perform a diagnostic circuit check of on-board microprocessor systems (self-test).
33.05 Define and determine open and closed loop system operation.
33.06 Explain and service an air injection system.
33.07 Explain and service thermal systems.
33.08 Explain and service charcoal canister purge systems.
33.09 Service pollution control valve systems.
33.10 Service exhaust gas-type fuel evaporative systems.
33.11 Service electric type fuel evaporative systems.
33.12 Explain, diagnose and demonstrate the servicing of the service exhaust gas recirculating systems.
33.13 Test vacuum switch.
33.14 Test solenoid operated vacuum switch.
33.15 Service and repair engine cooling fan systems.

33.16 Perform non-scan tool tests on inputs and controls of microprocessor systems.
33.17 Perform scan tool diagnostics on inputs and controls of microprocessor systems.
33.18 Test, service and repair microprocessor input sensors and control devices.
33.19 Demonstrate the use of manufacturers' diagnostic charts.
33.20 Perform system performance checks on electronic engine control systems.
33.21 Diagnose cold driveability problems.
33.22 Diagnose warm driveability problems.
33.23 Perform sensor adjustment.
33.24 Perform exhaust gas backpressure test.
33.25 Check and reset ignition timing and idle speed settings as per vehicle emission control information label.
33.26 Perform internal and external adjustments on electronic carburetors.
33.27 Test and adjust minimum air flow.
33.28 Analyze exhaust gases for proper emissions.
33.29 Test electronic idle air control.
33.30 Check idle stop solenoid.
33.31 Repair circuits with the use of wiring diagrams and component locator manuals.
33.32 Perform field repairs to wiring and connectors.
33.33 Test and service electronic ignition systems.
33.34 Test and service anti-detonation (knock sensor) devices.
33.35 Perform pin out tests and interpret readings.
33.36 Check engine vacuum systems for proper routing and connections.
33.37 Service air inlet systems.
33.38 Test and/or replace ignition coils.
33.39 Demonstrate the procedure for electronic control module.
33.40 Perform diagnostic test on torque convertor clutch circuit and components.
33.41 Perform fuel pump pressure test on vehicles equipped with electronic fuel injection.
33.42 Test specific gravity of fuel, analyze and check for contaminants.
33.43 Perform fuel injector balance test on vehicles equipped with individual fuel injectors.
33.44 Perform fuel system diagnosis and performance checks.
33.45 Perform fuel pressure level tests.
33.46 Disassemble/reassemble throttle body unit.
33.47 Perform fuel injector cleaning procedures.
33.48 Test mass air flow sensor.
33.49 Remove, test, adjust and/or replace fuel injector.
33.50 Demonstrate understanding of system components.
33.51 Repair vehicles displaying various service codes as they would be encountered in a service situation.

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Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Aviation Administration
Occupational Area:	Industrial Education
	PSV
CIP Number	0649.010400
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for initial employment as communication, transportation, utility management (15023004), air station managers (184.167-082) or provide supplemental training for persons previously or currently employed in these occupations.

The content should include, but not be limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, technical writing, records management, security, Federal Aviation Administration regulations, data processing, and air cargo transportation.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Aviation industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program and provide instruction in the development and reinforcement of skills in human relations, facility management and air cargo and passenger management.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate understanding of safe and efficient work practices.
02.0 Demonstrate understanding of Federal Aviation Administration, state and other governmental laws, rules and policies.
03.0 Demonstrate understanding of personnel management.
04.0 Demonstrate understanding of business law and management pertaining to aeronautics.
05.0 Demonstrate understanding of aviation safety and accident prevention and investigation.
06.0 Prepare, analyze and evaluate technical reports and data.
07.0 Demonstrate understanding of federal and state security procedures.
08.0 Maintain personnel records and budgets.
09.0 Evaluate facility maintenance problems and prescribe corrective action.
10.0 Demonstrate appropriate communication skills.
11.0 Demonstrate appropriate math skills.
12.0 Demonstrate appropriate understanding of basic science.
13.0 Demonstrate employability skills.
14.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Aviation Administration
Secondary Number:
Postsecondary Number: 0649.010400

01.0 DEMONSTRATE AN UNDERSTANDING OF SAFE AND EFFICIENT WORK PRACTICES--The student will be able to:

- 01.01 Demonstrate an awareness and understanding of health and safety hazards, prevention and correction of ecological problems and know the solutions unique to the industry.
- 01.02 Demonstrate an awareness and understanding of fueling hazards.
- 01.03 Demonstrate an awareness and understanding of physical hazards.
- 01.04 Demonstrate an awareness and understanding of fire hazards.
- 01.05 Demonstrate an awareness of and the ability to control and extinguish fires.
- 01.06 Demonstrate an awareness and understanding of the need for safety devices, controls, guards and equipment.
- 01.07 Demonstrate awareness, understanding and use of personal safety devices such as goggles, masks, helmets, hearing protectors, air respirators and protective clothing.

02.0 DEMONSTRATE UNDERSTANDING OF FEDERAL AVIATION ADMINISTRATION, STATE AND OTHER GOVERNMENTAL LAWS, RULES AND POLICIES--The student will be able to:

- 02.01 Describe the economic, social and political importance of commercial aviation, general aviation and aircraft manufacturing in the United States.
- 02.02 Describe the function, basic organization and responsibility of the National Transportation Safety Board.
- 02.03 Explain major portions of Parts 1, 61, 67, 91 and 830 of the Federal Aviation Regulations.
- 02.04 List and describe the federal statutes pertaining to the economic regulation of the airline industry.
- 02.05 List and describe the major federal statutes pertaining to the regulation of aviation safety.
- 02.06 Describe the historical and current relationship between the U.S. Post Office and the aviation industry.
- 02.07 List and describe six categories of general aviation.
- 02.08 Describe the development of aviation laws and their analogy to the Law of the Sea.
- 02.09 Explain the Department of Transportation, State of Florida, and its structure as relates to the aircraft industry.

03.0 DEMONSTRATE UNDERSTANDING OF PERSONNEL MANAGEMENT--The student will be able to:

- 03.01 Name and describe the basic guides in personnel management.
- 03.02 Discuss governmental relations in personnel management.

03.03 Explain the general nature of personnel problem, and approaches to problem solving.

03.04 State the general nature of job and personnel requirements; and technical and managerial employee requirements.

03.05 Tell the importance and scope of education; and the role of communication and the fundamental rules of communication.

03.06 Discuss the significance of remuneration and its problems; both economic and non-economic.

03.07 Describe training and education aspects of company programs.

03.08 State the role and purpose of interviewing and counseling.

04.0 DEMONSTRATE UNDERSTANDING OF BUSINESS LAW AND MANAGEMENT PERTAINING TO AERONAUTICS--The student will be able to:

04.01 Describe and identify in what manner and under what conditions an aviation company may expose itself to a lawsuit.

04.02 Discuss the fundamental aspects of several categories of law that may affect the company because of its activities.

04.03 State the fundamental principles of torts, contracts, bailments, labor, agency, negligence, administrative, product liability, partnerships, and corporations.

04.04 Explain how an employee's action or inaction may subject the aviation company to a law suit involving one or more of the several categories of law.

05.0 DEMONSTRATE UNDERSTANDING OF AVIATION SAFETY AND ACCIDENT PREVENTION AND INVESTIGATION--The student will be able to:

05.01 Describe and explain the complete regulation that is still exercised by the Federal government in the field of safety, and investigation.

05.02 State and discuss the portion of the Federal Aviation Act of 1958 as amended, which is generally described as Title VI, safety Regulations of Civil Aeronautics.

05.03 Tell the minimum standards governing design, materials workmanship, performance of aircraft, inspection, servicing, overhaul of aircraft, and parts and appliances, equipment and facilities, as required by Section 601(a) of Federal Aviation Act of 1958 Section 601(a).

05.04 Discuss the maximum hours of service for airmen and other employees, and other practices, methods, and procedures as required by Section 601(a) of the Federal Aviation Act of 1958.

05.05 Explain the Federal Aviation Regulations (FAR's) promulgated by the Administrator to implement the authority granted by the Federal Aviation Act of 1958, in the area of safety, and to prevent accidents.

06.0 PREPARE, ANALYZE AND EVALUATE TECHNICAL REPORTS AND DATA--The student will be able to:

06.01 State the five basic guidelines for preparation of technical reports.

06.02 Compare the difference between technical and literary description.

06.03 Describe the techniques used in technical report writing.
06.04 Discuss the arrangement of the technical written report - such as cause and effect, inductive and deductive, enumeration and classification, problems and solution.
06.05 Explain the preparatory work or stages in the process such as the writing, the drafts, use of the library, and polish style.
06.06 Tell types of reports, and describe use of illustrations.
06.07 Discuss the steps in developing an oral presentation.

07.0 DEMONSTRATE UNDERSTANDING OF FEDERAL AND STATE SECURITY PROCEDURES--The student will be able to:

07.01 Describe passenger security systems in use.
07.02 Describe and define federal security laws.
07.03 Identify local law enforcement agencies.
07.04 List known security risk features.
07.05 Describe cargo theft precautions in use at facility.
07.06 Describe the International Air Transport Association.
07.07 List the more common labels found in the "Restricted Articles Regulations" as published in bulletins by IATA.

08.0 MAINTAIN PERSONNEL RECORDS AND BUDGETS--The student will be able to:

08.01 State the scope of selection procedures.
08.02 Describe the nature of the information gathered about candidates.
08.03 Explain the process of interpreting the findings and making of decisions.
08.04 Tell the nature of the necessary reports and records of candidates rejected, and candidates accepted.
08.05 State the objectives of the personnel program as related to the overall objectives of the company, whether the company provides a service or a product.
08.06 Discuss the specific goals sought and tasks to be undertaken by the personnel department, such as the number of people to be hired, types of personnel, grievance or bargaining sessions, anticipated worker accidents or illnesses.
08.07 State the staff necessary to attain goals; and equipment and resources they will require.
08.08 Explain how the requirements to attain the stated company goals will necessitate the allocation of the stated budget in order to implement the requisite program.

09.0 EVALUATE FACILITY MAINTENANCE PROBLEMS AND PRESCRIBE CORRECTIVE ACTION--The student will be able to:

09.01 Describe and explain the complete regulation that is still exercised by the Federal government in the field of safety, and maintenance.
09.02 Tell the minimum standard for work practices including methods and procedures as required by Section 601 (a) of the Federal Aviation Act of 1958.

09.03 Explain the Federal Aviation Regulations (FAR's) promulgated by the Administrator to implement the authority granted by the Federal Aviation Act of 1958.

09.04 State the procedures and practices in conformity with the FAR's when FAA inspectors review the company practices.

10.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

10.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.

10.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.

10.03 Read and follow written and oral instructions.

10.04 Answer and ask questions coherently and concisely.

10.05 Read critically by recognizing assumptions and implications and by evaluating ideas.

10.06 Demonstrate appropriate telephone/communication skills.

11.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

11.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

11.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

11.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

11.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

11.05 Demonstrate an understanding of federal, state and local taxes and their computation.

12.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

12.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

12.02 Draw conclusions or make inferences from data.

12.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

12.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

13.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

13.01 Conduct a job search.

13.02 Secure information about a job.

13.03 Identify documents which may be required when applying for a job interview.

13.04 Complete a job application form correctly.

13.05 Demonstrate competence in job interview techniques.

13.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
13.07 Identify acceptable work habits.
13.08 Demonstrate knowledge of how to make appropriate job changes.
13.09 Demonstrate acceptable employee health habits.
13.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

14.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

14.01 Define entrepreneurship.
14.02 Describe the importance of entrepreneurship to the American economy.
14.03 List the advantages and disadvantages of business ownership.
14.04 Identify the risks involved in ownership of a business.
14.05 Identify the necessary personal characteristics of a successful entrepreneur.
14.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Aviation Maintenance Management
Occupational Area:	Industrial Education
	PSV
CIP Number	0649.010401
Grade Level	College Credits
Length	AS Degree/83
Certification	

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as aircraft mechanics (85323638), aircraft maintenance supervisors (OES 81002540), or aviation maintenance managers. Graduates will be eligible for FAA certification as airframe and powerplant mechanics and will be trained to troubleshoot maintenance problems and supervise mechanics in the aviation industry. This program also provides supplemental training for persons previously or currently employed in this occupation.

The program content will adhere to the Federal Aviation Regulations (FAR) Part 65 pertaining to eligibility for a mechanic certificate and rating(s). Instruction is designed to qualify students for Federal Aviation Administration (FAA) examinations for aviation maintenance powerplant and airframe technician certification as prescribed by FAR 147.

The program content should also include training in communication, management leadership, human relations, supervisory and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Aviation industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: practical hands-on experiences using the tools and equipment appropriate to the program content and in accordance with current practices in the industry. All the aforementioned activities are conducted in an organizational pattern conducive to good supervisory and management practices.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such

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organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The standard credit hour length for this program is 83 according to SBR 6A-14.030.

A student may elect to progress from airframe mechanic subjects or powerplant mechanic subjects without repeating the general mechanic skills. Upon completion of both the airframe and the powerplant competencies, the student will qualify as an airframe and powerplant mechanic.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Perform basic electricity skills.
02.0 Perform basic aircraft drawing skills.
03.0 Demonstrate aircraft weight and balance skills.
04.0 Maintain aircraft fluid lines and fittings.
05.0 Perform aircraft materials and process skills.
06.0 Perform ground operations and servicing duties.
07.0 Perform cleaning and corrosion control operations.
08.0 Demonstrate mathematics skills.
09.0 Maintain forms and records.
10.0 Apply basic physics to airframe and powerplant systems.
11.0 Demonstrate the use of maintenance publications.
12.0 Interpret mechanic privileges.
13.0 Perform basic reciprocating engine skills.
14.0 Perform basic turbine engine skills.
15.0 Perform engine inspection.
16.0 Maintain engine instrument systems.
17.0 Maintain engine fire protection systems.
18.0 Maintain engine electrical systems.
19.0 Maintain lubrication systems.
20.0 Maintain ignition systems.
21.0 Maintain fuel metering systems.
22.0 Maintain engine fuel systems.
23.0 Maintain injection systems.
24.0 Maintain engine cooling systems.
25.0 Maintain engine exhaust systems.
26.0 Maintain aircraft propellers.
27.0 Maintain wood structures.
28.0 Perform aircraft covering.
29.0 Apply aircraft finishes.
30.0 Repair sheetmetal structures.
31.0 Perform aircraft welding.
32.0 Perform airframe assembly and rigging.
33.0 Perform airframe inspection.

34.0 Maintain aircraft landing gear systems.
35.0 Maintain hydraulic and pneumatic power systems.
36.0 Maintain cabin atmosphere control systems.
37.0 Maintain aircraft instrument systems.
38.0 Maintain communication and navigation systems.
39.0 Inspect and repair aircraft fuel systems.
40.0 Inspect or repair aircraft electrical systems.
41.0 Inspect and repair position and warning systems.
42.0 Maintain ice and rain control systems.
43.0 Inspect and repair aircraft fire protection systems.
44.0 Demonstrate knowledge of FAA aircraft mechanic licensing requirements.
45.0 Demonstrate the ability to communicate skillfully.
46.0 Demonstrate the human relations skills necessary for success in supervision.
47.0 Demonstrate a knowledge of skills and attitudes the supervisor needs for effective performance.
48.0 Demonstrate a practical approach to job management.
49.0 Demonstrate appropriate communication skills.
50.0 Demonstrate appropriate math skills.
51.0 Demonstrate appropriate understanding of basic science.
52.0 Demonstrate employability skills.
53.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Aviation Maintenance Management
Secondary Number:
Postsecondary Number: 0649.010401

01.0 PERFORM BASIC ELECTRICITY SKILLS--The student will be able to:

- 01.01 Measure capacitance and inductance.
- 01.02 Calculate and measure electrical power.
- 01.03 Measure voltage, current, resistance, continuity, and leakage.
- 01.04 Determine the relationship of voltage, current, and resistance in electrical circuits.
- 01.05 Read and interpret electrical circuit diagrams.
- 01.06 Inspect and service batteries.
- 01.07 Utilize proper electrical safety procedures.

02.0 PERFORM BASIC AIRCRAFT DRAWING SKILLS--The student will be able to:

- 02.01 Use drawings, symbols, and schematic diagrams.
- 02.02 Draw sketches of repairs and alterations.
- 02.03 Use blueprint information.
- 02.04 Use graphs and charts.

03.0 DEMONSTRATE AIRCRAFT WEIGHT AND BALANCE SKILLS--The student will be able to:

- 03.01 Weigh aircraft.
- 03.02 Perform complete weight and balance check and record data.
- 03.03 Utilize proper personal safety procedures.

04.0 MAINTAIN AIRCRAFT FLUID LINES AND FITTINGS--The student will be able to:

- 04.01 Fabricate and install rigid and flexible fluid lines and fittings.
- 04.02 Identify and utilize special fluid line tools.

05.0 PERFORM AIRCRAFT MATERIALS AND PROCESSES SKILLS--The student will be able to:

- 05.01 Identify and select appropriate hand and power tools.
- 05.02 Identify and select appropriate nondestructive testing methods.
- 05.03 Perform penetrant, chemical etching, and magnetic particle inspections.
- 05.04 Perform basic heat-treating processes.
- 05.05 Identify and select aircraft hardware.
- 05.06 Inspect and check welds.
- 05.07 Perform precision measurements.
- 05.08 Perform safety wiring techniques.

06.0 PERFORM GROUND OPERATIONS AND SERVICING DUTIES--The student will be able to:

06.01 Start, ground operate, move, service, and secure aircraft.
06.02 Identify and select fuels.
06.03 Comply with prescribed shop and personal safety procedures.

07.0 PERFORM CLEANING AND CORROSION CONTROL OPERATIONS--The student will be able to:

07.01 Identify and select cleaning materials.
07.02 Perform aircraft cleaning and corrosion control.
07.03 Identify and utilize appropriate equipment for cleaning and corrosion control.
07.04 Observe appropriate personal safety procedures for corrosive chemicals.

08.0 DEMONSTRATE MATHEMATICAL SKILLS--The student will be able to:

08.01 Work with the common sets of real numbers in performing the four basic operations.
08.02 Use the four basic operations in working with polynomial expressions.
08.03 Solve linear equations in one variable and applied problems.
08.04 Solve linear inequalities in one variable and applied problems.
08.05 Factor polynomials.
08.06 Simplify algebraic fractions, complex fractions and solve rational and literal equations and applied problems.
08.07 Extract roots and raise numbers to a given power.
08.08 Determine areas and volumes of various geometrical shapes.
08.09 Solve ratio, proportion, and percentage problem.
08.10 Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers.
08.11 Graph linear equations and inequalities in two variables and solve graph systems of linear equations and inequalities in two variables.
08.12 Solve and graph quadratic equations and inequalities with real solutions and solve related word problems.

09.0 MAINTAIN FORMS AND RECORDS--The student will be able to:

09.01 Write descriptions of aircraft condition and work performed.
09.02 Complete required maintenance forms, records, and inspection reports.

10.0 APPLY BASIC PHYSICS TO AIRFRAME AND POWERPLANT SYSTEMS--The student will be able to:

10.01 Use the principles of simple machines; sound, fluid, and heat dynamics.
10.02 Explain the effect of air density on engine power output and airfoil lift.

11.0 DEMONSTRATE THE USE OF MAINTENANCE PUBLICATIONS--The student will be able to:

11.01 Select and use FAA and manufacturer's aircraft maintenance specifications and related regulations.
11.02 Read technical data.
11.03 Retrieve data from maintenance data banks.

12.0 INTERPRET MECHANIC PRIVILEGES--The student will be able to:

12.01 Exercise mechanic privileges within the limitations prescribed by FAR Part 65.
12.02 Comply with prescribed shop and personal safety procedures.

13.0 PERFORM BASIC RECIPROCATING ENGINE SKILLS--The student will be able to:

13.01 Inspect and repair 14-cylinder or larger radial engine.
13.02 Overhaul reciprocating engine.
13.03 Inspect, check, service, and repair opposed and radial engines and reciprocating engine installations.
13.04 Install, troubleshoot, and remove reciprocating engines.

14.0 PERFORM BASIC TURBINE ENGINE SKILLS--The student will be able to:

14.01 Overhaul turbine engine.
14.02 Inspect, check, service, and repair turbine engines and turbine engine installations.
14.03 Install, troubleshoot, and remove turbine engines.

15.0 PERFORM ENGINE INSPECTION--The student will be able to:

15.01 Perform powerplant conformity and air worthiness inspections.
15.02 Perform appropriate safety wiring checks.

16.0 MAINTAIN ENGINE INSTRUMENT SYSTEMS--The student will be able to:

16.01 Troubleshoot, service, and repair fluid rate-of-flow indicating systems.
16.02 Inspect, check, service, troubleshoot, and repair engine temperature, pressure, and rpm indicating systems.

17.0 MAINTAIN ENGINE FIRE PROTECTION SYSTEMS--The student will be able to:

17.01 Inspect, check, service, troubleshoot, and repair engine fire detection and extinguishing systems.
17.02 Perform appropriate safety wiring check and repairs.

18.0 MAINTAIN ENGINE ELECTRICAL SYSTEMS--The student will be able to:

18.01 Repair engine electrical system components.
18.02 Install, check and service engine electrical wiring, controls, switches, indicators, and protective devices.
18.03 Identify and utilize special electrical tools and equipment.

19.0 MAINTAIN LUBRICATION SYSTEMS--The student will be able to:

19.01 Identify and select lubricants.

19.02 Repair engine lubrication system components.
19.03 Inspect, check, service, troubleshoot, and repair engine lubrication system.

20.0 MAINTAIN IGNITION SYSTEMS--The student will be able to:

20.01 Overhaul magneto and ignition harness.
20.02 Repair engine ignition system components.
20.03 Inspect, check, service, troubleshoot, and repair reciprocating and turbine engine ignition systems.

21.0 MAINTAIN FUEL METERING SYSTEMS--The student will be able to:

21.01 Inspect, check, and service water injection systems.
21.02 Overhaul carburetor.
21.03 Repair engine fuel metering system components.
21.04 Inspect, check, troubleshoot, and repair reciprocating and turbine engine fuel metering systems.
21.05 Perform safety wiring techniques.

22.0 MAINTAIN ENGINE FUEL SYSTEMS--The student will be able to:

22.01 Repair engine fuel system components.
22.02 Inspect, check, service, troubleshoot, and repair engine fuel systems.
22.03 Inspect, check, service, and repair carburetor air intake and induction manifolds.

23.0 MAINTAIN INJECTION SYSTEMS--The student will be able to:

24.0 MAINTAIN ENGINE COOLING SYSTEMS--The student will be able to:

24.01 Repair engine cooling system components.
24.02 Inspect, check, troubleshoot, service and repair engine cooling systems.

25.0 MAINTAIN ENGINE EXHAUST SYSTEMS--The student will be able to:

25.01 Repair engine exhaust system components.
25.02 Inspect, check, troubleshoot, service and repair engine exhaust systems.

26.0 MAINTAIN AIRCRAFT PROPELLERS--The student will be able to:

26.01 Inspect, check, service and repair propeller synchronizing and ice control systems.
26.02 Identify and select propeller lubricants.
26.03 Balance propellers.
26.04 Repair propeller control system components.
16.05 Inspect and repair fixed-pitch, constant speed and feathering propellers and governing systems.
26.06 Install, troubleshoot and remove propellers.

27.0 MAINTAIN WOOD STRUCTURES--The student will be able to:

27.01 Service and repair wood structures.
27.02 Identify wood defects.
27.03 Inspect wood structures.

28.0 PERFORM AIRCRAFT COVERING--The student will be able to:

28.01 Select and apply fabric and fiberglass covering materials.
28.02 Inspect, test and repair fabric and fiberglass.

29.0 APPLY AIRCRAFT FINISHES--The student will be able to:

29.01 Apply trim, letters and touch-up paint.
29.02 Identify and select aircraft finishing materials.
29.03 Apply paint and dope.
29.04 Inspect finishes and identify defects.
29.05 Adhere to all safety practices dealing with flammable materials.

30.0 REPAIR SHEET METAL STRUCTURES--The student will be able to:

30.01 Identify and utilize appropriate metalworking tools and equipment.
30.02 Install special rivets and fasteners.
30.03 Inspect bonded structures.
30.04 Inspect and repair plastics, honeycomb and laminated structures.
30.05 Inspect, check, service and repair windows, doors and interior furnishings.
30.06 Inspect and repair sheet-metal structures.
30.07 Install conventional rivets.
30.08 Hand form, lay out and bend sheet metal.

31.0 PERFORM AIRCRAFT WELDING--The student will be able to:

31.01 Identify and utilize appropriate welding equipment and material.
31.02 Solder stainless steel.
31.03 Fabricate tubular structures.
31.04 Solder, braze, gas-weld and arc-weld steel.
31.05 Weld aluminum and stainless steel.
31.06 Weld magnesium and titanium.

32.0 PERFORM AIRFRAME ASSEMBLY AND RIGGING--The student will be able to:

32.01 Identify and utilize appropriate rigging tools and equipment.
32.02 Rig rotary-wing aircraft.
32.03 Rig fixed-wing aircraft.
32.04 Check alignment of structures.
32.05 Assemble aircraft.
32.06 Balance and rig movable structures.
32.07 Jack aircraft.

33.0 PERFORM AIRFRAME INSPECTION--The student will be able to:

33.01 Perform conformity and airworthiness inspections.
33.02 Properly complete compliance forms and records.

34.0 MAINTAIN AIRCRAFT LANDING GEAR SYSTEMS--The student will be able to:

34.01 Inspect, check, service and repair landing gear retraction systems.
34.02 Inspect, check, service and repair shock struts, brakes, wheels, tires and steering systems.

35.0 MAINTAIN HYDRAULIC AND PNEUMATIC POWER SYSTEMS--The student will be able to:

35.01 Repair hydraulic and pneumatic power system components.
35.02 Identify and repair hydraulic fluids.
35.03 Inspect and repair hydraulic and pneumatic power systems.
35.04 Identify and utilize appropriate hydraulic and pneumatic tools and equipment.

36.0 MAINTAIN CABIN ATMOSPHERE CONTROL SYSTEMS--The student will be able to:

36.01 Repair air conditioning, pressurization and oxygen system components.
36.02 Inspect and repair heating, air conditioning and pressurization systems.
36.03 Inspect, check, troubleshoot, service and repair oxygen systems.

37.0 MAINTAIN AIRCRAFT INSTRUMENT SYSTEMS--The student will be able to:

37.01 Remove and install electrical, mechanical and pneumatic instruments.
37.02 Inspect and repair heading, speed, altitude, attitude and position systems.

38.0 MAINTAIN COMMUNICATION AND NAVIGATION SYSTEMS--The student will be able to:

38.01 Inspect, check and service auto-pilot and approach control systems.
38.02 Inspect, check and service electronic communication and navigation systems.
38.03 Inspect and repair antenna and electronic equipment installations.
38.04 Identify and utilize special electronic tools and equipment.

39.0 INSPECT AND REPAIR AIRCRAFT FUEL SYSTEMS--The student will be able to:

39.01 Check and service fuel dump systems.
39.02 Perform fuel management, transfer and defueling.
39.03 Inspect, check and repair pressure fuel systems.
39.04 Repair aircraft fuel system components.
39.05 Inspect and repair fluid quantity indicating systems.

39.06 Troubleshoot, service and repair fluid and temperature warning systems.
39.07 Inspect, check, service, troubleshoot and repair aircraft fuel systems.

40.0 INSPECT AND REPAIR AIRCRAFT ELECTRICAL SYSTEMS--The student will be able to:

40.01 Identify and utilize appropriate electrical tools and equipment.
40.02 Repair aircraft electrical system components.
40.03 Remove, service and install electric indicators, protective devices, wiring and controls.
40.04 Inspect and repair AC and DC current electrical systems.

41.0 INSPECT AND REPAIR POSITION AND WARNING SYSTEMS--The student will be able to:

41.01 Inspect, check and service speed- and takeoff-warning systems, electrical brake controls and antiskid systems.
41.02 Inspect and repair landing gear and position indicating warning systems.

42.0 MAINTAIN ICE AND RAIN CONTROL SYSTEMS--The student will be able to:

42.01 Inspect, service and repair airframe ice and rain control systems.
42.02 Demonstrate operation of airframe ice and rain control systems.

43.0 INSPECT AND REPAIR AIRCRAFT FIRE PROTECTION SYSTEMS--The student will be able to:

43.01 Inspect, check and service smoke and carbon monoxide detection systems.
43.02 Inspect and repair fire detection and fire extinguishing systems.

44.0 DEMONSTRATE KNOWLEDGE OF FAA AIRCRAFT MECHANIC LICENSING REQUIREMENTS--The student will be able to:

44.01 Successfully complete the FAA powerplant written, oral and practical examinations.
44.02 Display an FAA powerplant Mechanic's certificate.
44.03 Successfully complete the FAA airframe written, oral and practical examinations.
44.04 Display an FAA airframe mechanic's certificate.

45.0 DEMONSTRATE THE ABILITY TO COMMUNICATE SKILLFULLY--The student will be able to:

45.01 Describe the importance of clear and concise writing.
45.02 Demonstrate proficiency in the effective use of speech and vocabulary.
45.03 Explain the importance of good listening skills.

45.04 Discuss the role communication plays in management.
45.05 Demonstrate the components of the communication process.
45.06 Demonstrate effective written communication skills.
45.07 Demonstrate effective oral communication skills.
45.08 Write technical reports.

46.0 DEMONSTRATE THE HUMAN RELATIONS SKILLS NECESSARY FOR SUCCESS IN SUPERVISION--The student will be able to:

46.01 Exhibit the ability to get along with others.
46.02 Discuss the importance of human relations.
46.03 Develop and demonstrate the unique human relations skills needed for successful entry and progress in supervising others.

47.0 DEMONSTRATE KNOWLEDGE OF SKILLS AND ATTITUDES THE SUPERVISOR NEEDS FOR EFFECTIVE PERFORMANCE--The student will be able to:

47.01 Describe leadership theory and its complexity.
47.02 Discuss how a new supervisor is introduced to leadership responsibilities.
47.03 Identify the legal and social environment for supervision.
47.04 Discuss pertinent legislation and the role of government intervention.
47.05 Describe problems in union and non-union organizations.

48.0 DEMONSTRATE A PRACTICAL APPROACH TO JOB MANAGEMENT--The student will be able to:

48.01 Assume responsibility in planning and coordinating resources.
48.02 Demonstrate effective decision making and problem solving techniques.
48.03 Implement methods of work improvement.

49.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

49.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
49.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
49.03 Read and follow written and oral instructions.
49.04 Answer and ask questions coherently and concisely.
49.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
49.06 Demonstrate appropriate telephone/communication skills.

50.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

50.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
50.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

50.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

50.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

50.05 Demonstrate an understanding of federal, state and local taxes and their computation.

51.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

51.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

51.02 Draw conclusions or make inferences from data.

51.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

51.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

52.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

52.01 Conduct a job search.

52.02 Secure information about a job.

52.03 Identify documents which may be required when applying for a job interview.

52.04 Complete a job application form correctly.

52.05 Demonstrate competence in job interview techniques.

52.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

52.07 Identify acceptable work habits.

52.08 Demonstrate knowledge of how to make appropriate job changes.

52.09 Demonstrate acceptable employee health and grooming habits.

52.10 Exhibit punctuality, initiative, courtesy, loyalty and honesty.

52.11 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

53.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

53.01 Define entrepreneurship.

53.02 Describe the importance of entrepreneurship to the American economy.

53.03 List the advantages and disadvantages of business ownership.

53.04 Identify the risks involved in ownership of a business.

53.05 Identify the necessary personal characteristics of a successful entrepreneur.

53.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CLUSTER CURRICULUM FRAMEWORK

Cluster Title:	Aviation Maintenance Technology
Cluster Type:	Job Preparatory
Occupational Area:	Industrial Education
Components	Core, Two Programs, Three Occupational Completion Points
	PSAV
Grade Level	30, 31
Facility Code	245
VSO	VICA
Co-op Method	No
Apprenticeship	Yes

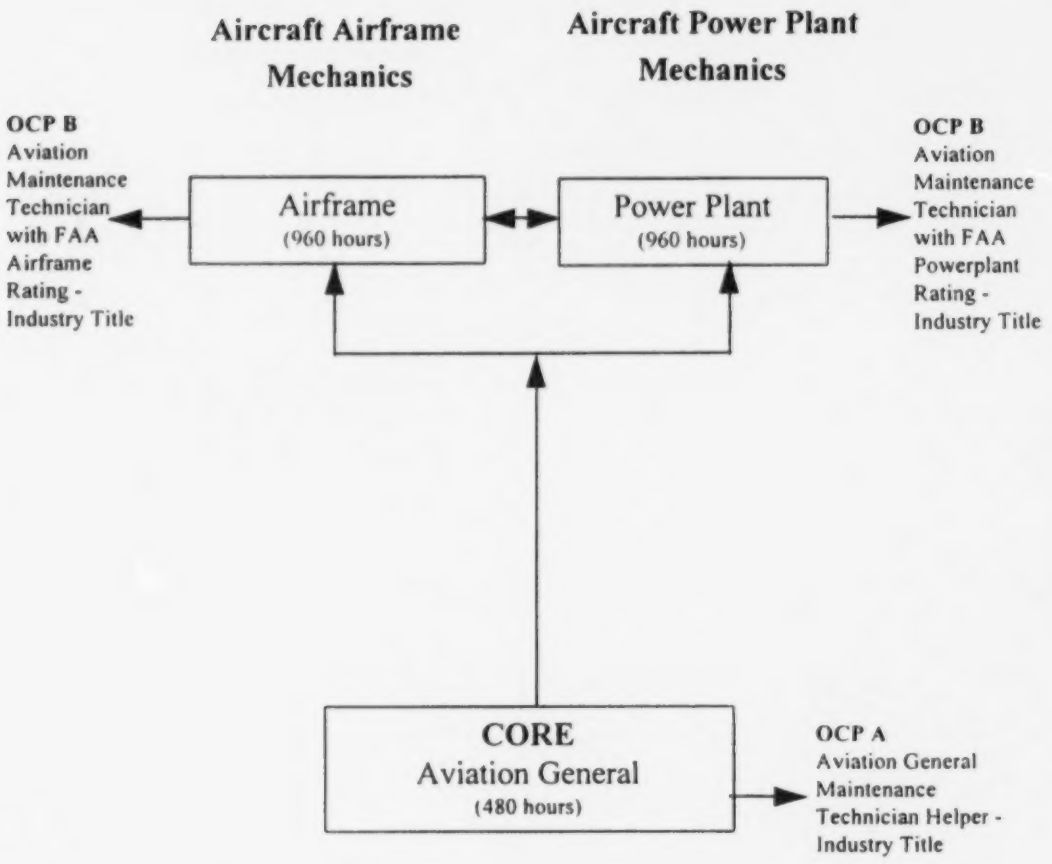
I. **PURPOSE:** The purpose of the programs in this cluster is to prepare students for employment or advanced training in the commercial and general aviation industry. Instruction is designed to prepare students for Federal Aviation Administration (FAA) license examinations for Airframe and Powerplant ratings. Federal Aviation Regulation (FAR) Part 147 identifies minimum requirements for AMT schools. Any changes to the FAA-approved course content must be approved in advance. The programs in this cluster prepare students for employment as an Aviation General Maintenance Technician Helper (Industry Title), an Aviation Maintenance Technician with FAA Airframe Rating (Industry Title), and an Aviation Maintenance Technician with FAA Powerplant Rating (Industry Title). The programs in this cluster provide supplemental training for persons previously or currently employed in this occupation.

This cluster focuses on broad, transferable skills, stresses understanding of all aspects of the aviation maintenance industry, and demonstrates elements of the industry such as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

II. **CLUSTER STRUCTURE:** This cluster is a planned sequence of instruction consisting of two programs with one common core and three occupational completion points. With this sequence, a student may complete specified portions of the cluster for employment or continue to advanced training. A student who fulfills the applicable competencies at any occupational completion point may terminate and still be considered an occupational completer.

The following diagram illustrates the structure of the cluster:

AVIATION MAINTENANCE TECHNOLOGY



III. **LABORATORY ACTIVITIES:** Classroom, shop, and laboratory activities are an integral part of this program. FAR Section 147.21(e) requires teaching of at least 50 percent of the curriculum in the shop or laboratory. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation.

IV. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc. (VICA), is the appropriate vocational student organization (VSO) for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

This cluster is offered in postsecondary adult vocational (PSAV) courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S. A student may elect to progress from one level to another without repeating the Aviation General courses. Aviation General is considered completed once all of the courses are passed. FAA license exams for ratings in an advanced program (Airframe or Powerplant) may be taken only after completion of both Aviation General and the advanced instruction. To become an Aviation Maintenance Technician with Airframe and Powerplant ratings, a student must complete both Airframe and Powerplant levels of instruction and pass the FAA exams.

Required FAA exams include GENERAL written, oral, and practical; AIRFRAME written, oral, and practical; and POWERPLANT written, oral, and practical. The only way a person can get authorization to take these examinations is to (1) graduate from an approved school or (2) obtain permission from the FAA to take the test based on prior experience on certificated aircraft. Schools cannot grant permission (FAA FAR, Part 65 and Part 147, Subpart C 147.31).

Since an Aviation Maintenance Technician School (AMTS) is certificated and inspected by the FAA, satisfaction of FAR Part 147 requirements should be the primary concern of an AMTS. When local and state educational requirements conflict with the FAA's regulation of an AMTS, those requirements must be resolved to satisfy FAR Part 147. In other words, FAA standards take precedence over other requirements. The FAA specifies minimum hours required and encourages schools to exceed minimum standards for the curriculum. The course content specified by the FAA may not be lowered.

"FAA FAR Part 147" identifies standards required by the FAA. Minimum teaching levels expected by the FAA also appear:

Level 1: knowledge of general principles
Level 2: knowledge of general principles and limited practical application
Level 3: knowledge of general principles with a high degree of practical application and hands-on skill levels

According to FAA FAR Part 147: For subjects taught at Level 3, all special tools required to meet "return to service" standards must be in satisfactory working condition, properly calibrated/tested, and of the proper kind for the purpose for which they are intended. Tools should include an adequate supply of special tools appropriate to the ratings and curriculum. If students are required to provide hand tools, then the school should list the specific tools with the curriculum and provide a copy of this list to the students. Shop equipment and special tools should be maintained in good working order and be in a condition for safe operation.

All tools and equipment should be maintained in good working order and be in a condition for safe operation. The types of tools and equipment required for Aviation General, Airframe, and Powerplant teaching include the ones listed below:

common hand tools
precision tools
torquing tools
specialized tools and equipment
aircraft
portable tools
machine tools
shop equipment and machinery
airframe structures
airframes, powerplants, propellers, and components of this equipment

FAA FAR Part 147 states: Each certificated Aviation Maintenance Technician school shall provide facilities, equipment, and material equal to the standards currently required for the issue of the certificate and rating that it holds.

Refer to FAA FAR Part 147 and industry publications for more information about required levels of proficiency, hours of instruction, and updates to occupational titles and training requirements. Keeping pace with the standards of industry and maintaining a high quality of training requires ongoing linkages with industry and FAA representatives.

The cooperative method of instruction is not appropriate for this program. Training for the Airframe and Powerplant ratings, according to FAA FAR Part 147 and Part 65.77, may not include OJT or cooperative training. Schools may not grant credit for OJT.

In accordance with Rule 6A-10.040, FAC, the minimum basic-skills grade levels required for postsecondary adult vocational students to exit the programs in this cluster are listed before the intended outcomes for the program. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion of the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) or a remedial lab. Please refer to the Rule for exemptions.

When a student with a disability is enrolled in a vocational class for which modifications to the curriculum framework have been made, the particular outcomes and student performance standards that the student must master to earn credit must be specified in the student's individual

educational plan (IEP). Modifications must be approved by the FAA. Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

V. SCANS Competencies: To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this cluster must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

Program Title: Aircraft Airframe Mechanic

July 1997

Florida Department of Education
INTENDED OUTCOMES

	PSAV
Program Number	**I470612**
CIP Number	0647060700
Grade level	30, 31
Length	1,440 Hours
Certification	AIR MECH @7G
Basic-Skills Grade Level	
Math	9
Language	9
Reading	9

INTENDED OUTCOMES: After successfully completing the appropriate content for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Aviation General Maintenance Technician Helper--Industry Title

01.0 Perform basic electricity skills.
02.0 Perform basic aircraft drawing skills.
03.0 Demonstrate aircraft weight and balance skills.
04.0 Maintain aircraft fluid lines and fittings.
05.0 Perform aircraft materials and processes skills.
06.0 Perform ground operations and servicing duties.
07.0 Perform cleaning and corrosion-control operations.
08.0 Demonstrate mathematical skills.
09.0 Maintain forms and records.
10.0 Apply basic physics to aircraft systems.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate the use of maintenance publications.
13.0 Interpret mechanic privileges and limitations.
14.0 Identify Federal Aviation Administration (FAA) licensing requirements.
15.0 Demonstrate appropriate communication skills.
16.0 Demonstrate employability skills as an aviation general maintenance technician helper.
17.0 Demonstrate an understanding of entrepreneurship related to opportunities in aviation general maintenance occupations.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Aviation Maintenance Technician with FAA Airframe Rating--Industry Title

18.0 Maintain wood structures.
19.0 Perform aircraft covering.
20.0 Apply aircraft finishes.
21.0 Repair sheet-metal structures.
22.0 Perform welding.
23.0 Perform assembly and rigging.
24.0 Perform airframe inspection.

25.0 Maintain aircraft landing-gear systems.
26.0 Maintain hydraulic and pneumatic power systems.
27.0 Maintain cabin atmosphere control systems.
28.0 Maintain aircraft instrument systems.
29.0 Maintain communication and navigation systems.
30.0 Inspect and repair aircraft fuel systems.
31.0 Inspect and repair aircraft electrical systems.
32.0 Inspect and repair position and warning systems.
33.0 Maintain ice and rain control systems.
34.0 Inspect and repair aircraft fire-protection systems.
35.0 Demonstrate knowledge of Federal Aviation Administration Airframe licensing requirements.
36.0 Demonstrate employability skills as an aviation maintenance technician with an FAA airframe rating.
37.0 Demonstrate an understanding of entrepreneurship related to opportunities in aviation airframe maintenance occupations.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Aircraft Airframe Mechanic
Secondary Number:
Postsecondary Number: I470612

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Aviation General Maintenance Technician Helper--Industry Title

01.0 PERFORM BASIC ELECTRICITY SKILLS--The student will be able to:

- 01.01 Calculate and measure capacitance and inductance. [FAA FAR Part 147, Level 2]
- 01.02 Calculate and measure electrical power. [FAA FAR Part 147, Level 2]
- 01.03 Measure voltage, current, resistance, and continuity. [FAA FAR Part 147, Level 3]
- 01.04 Determine the relationship of voltage, current, and resistance in electrical circuits. [FAA FAR Part 147, Level 3]
- 01.05 Read and interpret aircraft electrical-circuit diagrams, including solid-state devices and logic functions.[FAA FAR Part 147,[Level 3]
- 01.06 Inspect and service batteries.[FAA FAR Part 147, Level 3]
- 01.07 Utilize proper electrical safety procedures.

02.0 PERFORM BASIC AIRCRAFT DRAWING SKILLS--The student will be able to:

- 02.01 Use aircraft drawings, symbols, and system schematics.[FAA FAR Part 147, Level 2]
- 02.02 Draw sketches of repairs and alterations.[FAA FAR Part 147, Level 3]
- 02.03 Use blueprint information.[FAA FAR Part 147, Level 3]
- 02.04 Use graphs and charts.[FAA FAR Part 147, Level 3]

03.0 DEMONSTRATE AIRCRAFT WEIGHT AND BALANCE SKILLS--The student will be able to:

- 03.01 Weigh aircraft.[FAA FAR Part 147, Level 2]
- 03.02 Perform complete weight-and-balance check and record data.[FAA FAR Part 147, Level 3]
- 03.03 Utilize proper personal safety procedures.

04.0 MAINTAIN AIRCRAFT FLUID LINES AND FITTINGS--The student will be able to:

- 04.01 Fabricate and install rigid and flexible fluid lines and fittings.[FAA FAR Part 147, Level 3]
- 04.02 Identify and utilize special fluid-line tools.
- 04.03 Utilize proper personal safety procedures for fluid lines and fittings.

05.0 PERFORM AIRCRAFT MATERIALS AND PROCESSES SKILLS--The student will be able to:

05.01 Identify and select appropriate nondestructive testing methods. [FAA FAR Part 147, Level 1]
05.02 Perform dye penetrant, eddy current, ultrasonic, and magnetic particle inspections. [FAA FAR Part 147, Level 2]
05.03 Perform basic heat-testing processes. [FAA FAR Part 147, Level 1]
05.04 Identify and select aircraft hardware and materials. [FAA FAR Part 147, Level 3]
05.05 Inspect and check welds. [FAA FAR Part 147, Level 3]
05.06 Perform precision measurements. [FAA FAR Part 147, Level 3]
05.07 Perform safety wiring techniques.

06.0 PERFORM GROUND OPERATIONS AND SERVICING DUTIES--The student will be able to:

06.01 Start, ground operate, move, service, and secure aircraft and identify typical ground-operations hazards. [FAA FAR Part 147, Level 2]
06.02 Identify and select fuels. [FAA FAR Part 147, Level 2]
06.03 Comply with prescribed shop and personal safety procedures.

07.0 PERFORM CLEANING AND CORROSION-CONTROL OPERATIONS--The student will be able to:

07.01 Identify and select cleaning materials. [FAA FAR Part 147, Level 3]
07.02 Inspect, identify, remove, and treat aircraft corrosion and perform aircraft cleaning. [FAA FAR Part 147, Level 3]
07.03 Identify and utilize appropriate equipment for cleaning and corrosion control.
07.04 Observe appropriate personal safety procedures for corrosive chemicals.

08.0 DEMONSTRATE MATHEMATICAL SKILLS--The student will be able to:

08.01 Extract roots and raise numbers to a given power. [FAA FAR Part 147, Level 3]
08.02 Determine areas and volumes of various geometrical shapes by solving problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders. [FAA FAR Part 147, Level 3]
08.03 Solve ratio, proportion, and percentage problems. [FAA FAR Part 147, Level 3]
08.04 Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers. [FAA FAR Part 147, Level 3]
08.05 Measure tolerances on horizontal and vertical surfaces using millimeters, centimeters, feet, and inches.
08.06 Identify costs, prices, and taxes for the purchase and sale of materials that may be required when performing the duties of an Aviation Maintenance Technician.

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09.0 MAINTAIN FORMS AND RECORDS--The student will be able to:

09.01 Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records. [FAA FAR Part 147, Level 3]
09.02 Complete required maintenance forms, records, and inspection reports. [FAA FAR Part 147, Level 3]

10.0 APPLY BASIC PHYSICS TO AIRCRAFT SYSTEMS--The student will be able to:

10.01 Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight. [FAA FAR Part 147, Level 2]

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials and know the proper precautions required for handling such materials.
11.04 Understand pressure measurement in terms of PSI, inches of mercury, and KPA.

12.0 DEMONSTRATE THE USE OF MAINTENANCE PUBLICATIONS--The student will be able to:

12.01 Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material. [FAA FAR Part 147, Level 3]
12.02 Read technical data. [FAA FAR Part 147, Level 3]

13.0 INTERPRET MECHANIC PRIVILEGES AND LIMITATIONS--The student will be able to:

13.01 Exercise mechanic privileges within the limitations prescribed by Part 65 of this chapter. [FAA FAR Part 147, Level 3]

14.0 IDENTIFY FEDERAL AVIATION ADMINISTRATION LICENSING REQUIREMENTS--The student will be able to:

14.01 Identify the information in Federal Aviation Regulations (FAR) Part 65 pertaining to eligibility for Aviation Maintenance Technician (AMT) certification and ratings.
14.02 Identify the FAA requirements that must be satisfied in order to display the FAA Airframe and Powerplant license.

15.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

15.01 Write logical and understandable statements or phrases to accurately complete forms/invoices commonly used in business and industry.
15.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
15.03 Read and follow written and oral instructions.
15.04 Answer and ask questions coherently and concisely.
15.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
15.06 Demonstrate appropriate telephone/communication skills.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS AS AN aviation general maintenance technician helper--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Identify documents that may be required when applying for a job position.
16.04 Complete a job-application form correctly.
16.05 Demonstrate job-interview skills.
16.06 Identify appropriate responses to criticism from employer, supervisor, or other employees.
16.07 Identify work habits for getting and keeping a job.
16.08 Explain how to make job changes.
16.09 Explain the purpose of the Florida "Right-to-Know" law, Florida Statutes, Chapter 442.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP RELATED TO OPPORTUNITIES IN AVIATION GENERAL MAINTENANCE OCCUPATIONS--The student will be able to:

17.01 Define entrepreneurship.
17.02 Describe the importance of entrepreneurship to the United States economy.
17.03 List the advantages and disadvantages of business ownership.
17.04 Identify the risks involved in ownership of a business.
17.05 Identify the necessary personal characteristics of a successful entrepreneur.
17.06 Identify the business skills needed to operate a small business efficiently and effectively.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Aviation Maintenance Technician with FAA Airframe Rating--Industry Title

18.0 MAINTAIN WOOD STRUCTURES--The student will be able to:

18.01 Service and repair wood structures.[FAA FAR Part 147, Level 1]
18.02 Identify wood defects.[FAA FAR Part 147, Level 1]
18.03 Inspect wood structures.[FAA FAR Part 147, Level 1]

19.0 PERFORM AIRCRAFT COVERING--The student will be able to:

19.01 Select and apply fabric and fiberglass covering materials. [FAA FAR Part 147, Level 1]
19.02 Inspect, test, and repair fabric and fiberglass. [FAA FAR Part 147, Level 1]

20.0 APPLY AIRCRAFT FINISHES--The student will be able to:

20.01 Apply trim, letters, and touch-up paint. [FAA FAR Part 147, Level 1]
20.02 Identify and select aircraft finishing materials. [FAA FAR Part 147, Level 2]
20.03 Apply finishing materials. [FAA FAR Part 147, Level 2]
20.04 Inspect finishes and identify defects. [FAA FAR Part 147, Level 2]

21.0 REPAIR SHEET-METAL STRUCTURES--The student will be able to:

21.01 Select, install, and remove special fasteners for metallic, bonded, and composite structures. [FAA FAR Part 147, Level 2]
21.02 Inspect bonded structures. [FAA FAR Part 147, Level 2]
21.03 Inspect, test, and repair fiberglass, plastics, honeycomb, composite, and laminated primary and secondary structures. [FAA FAR Part 147, Level 2]
21.04 Inspect, check, service, and repair windows, doors, and interior furnishings. [FAA FAR Part 147, Level 2]
21.05 Inspect and repair sheet-metal structures. [FAA FAR Part 147, Level 3]
21.06 Install conventional rivets. [FAA FAR Part 147, Level 3]
21.07 Form, lay out, and bend sheet metal. [FAA FAR Part 147, Level 3]
21.08 Identify and utilize appropriate metalworking tools and equipment.

22.0 PERFORM WELDING--The student will be able to:

22.01 Weld magnesium and titanium. [FAA FAR Part 147, Level 1]
22.02 Solder stainless steel. [FAA FAR Part 147, Level 1]
22.03 Fabricate tubular structures. [FAA FAR Part 147, Level 1]
22.04 Solder, braze, gas-weld, and arc-weld steel. [FAA FAR Part 147, Level 2]
22.05 Weld aluminum and stainless steel. [FAA FAR Part 147, Level 1]
22.06 Identify and utilize appropriate welding tools and equipment.

23.0 PERFORM ASSEMBLY AND RIGGING--The student will be able to:

23.01 Rig rotary-wing aircraft. [FAA FAR Part 147, Level 1]
23.02 Rig fixed-wing aircraft. [FAA FAR Part 147, Level 2]
23.03 Check alignment of structures. [FAA FAR Part 147, Level 2]
23.04 Assemble aircraft components, including flight control surfaces. [FAA FAR Part 147, Level 3]
23.05 Balance, rig, and inspect movable primary and secondary flight control structures. [FAA FAR Part 147, Level 3]

23.06 Jack aircraft. [FAA FAR Part 147, Level 3]
23.07 Identify and utilize appropriate rigging tools and equipment.

24.0 PERFORM AIRFRAME INSPECTION--The student will be able to:

24.01 Perform aircraft conformity and airworthiness inspections. [FAA FAR Part 147, Level 3]

25.0 MAINTAIN AIRCRAFT LANDING-GEAR SYSTEMS--The student will be able to:

25.01 Inspect, check, service, and repair landing gear, retraction systems, shock struts, brakes, wheels, tires, and steering systems. [FAA FAR Part 147, Level 3]

26.0 MAINTAIN HYDRAULIC AND PNEUMATIC POWER SYSTEMS--The student will be able to:

26.01 Repair hydraulic and pneumatic power system components. [FAA FAR Part 147, Level 2]
26.02 Identify and select hydraulic fluids. [FAA FAR Part 147, Level 3]
26.03 Inspect, check, service, troubleshoot, and repair hydraulic and pneumatic power systems. [FAA FAR Part 147, Level 3]
26.04 Identify and utilize appropriate hydraulic and pneumatic tools and equipment.

27.0 MAINTAIN CABIN ATMOSPHERE-CONTROL SYSTEMS--The student will be able to:
27.01 Inspect, check, troubleshoot, service, and repair heating, cooling, air-conditioning, pressurization systems, and air-cycle machines. [FAA FAR Part 147, Level 1]
27.02 Inspect, check, troubleshoot, service, and repair oxygen systems. [FAA FAR Part 147, Level 2]

28.0 MAINTAIN AIRCRAFT INSTRUMENT SYSTEMS--The student will be able to:

28.01 Inspect, check, service, troubleshoot, and repair electronic flight-instrument systems and both mechanical and electrical heading, speed, altitude, temperature, pressure, and position-indicating systems to include the use of built-in test equipment. [FAA FAR Part 147, Level 1]
28.02 Install instruments and perform a static pressure-system leak test. [FAA FAR Part 147, Level 2]

29.0 MAINTAIN COMMUNICATION AND NAVIGATION SYSTEMS--The student will be able to:

29.01 Inspect, check, and troubleshoot auto-pilot, servos, and approach coupling systems. [FAA FAR Part 147, Level 1]
29.02 Inspect, check, and service aircraft electronic communication and navigation systems, including VHF passenger address interphones and static-discharge devices, aircraft VOR, ILS, LORAN, radar beacon transponders, flight-management computers, and GPWS. [FAA FAR Part 147, Level 1]
29.03 Inspect and repair antenna and electronic equipment installations. [FAA FAR Part 147, Level 2]

29.04 Identify and utilize special electronic tools and equipment. [FAA FAR Part 147, Level 2]

30.0 INSPECT AND REPAIR AIRCRAFT FUEL SYSTEMS--The student will be able to:

30.01 Check and service fuel-dump systems. [FAA FAR Part 147, Level 1]
30.02 Perform fuel-management transfer, re-fueling, and de-fueling. [FAA FAR Part 147, Level 1]
30.03 Inspect, check, and repair pressure fuel systems. [FAA FAR Part 147, Level 1]
30.04 Repair aircraft fuel-system components. [FAA FAR Part 147, Level 2]
30.05 Inspect and repair fluid quantity-indicating systems. [FAA FAR Part 147, Level 2]
30.06 Troubleshoot, service, and repair fluid pressure and temperature warning systems. [FAA FAR Part 147, Level 2]
30.07 Inspect, check, service, troubleshoot, and repair aircraft fuel systems. [FAA FAR Part 147, Level 3]

31.0 INSPECT AND REPAIR AIRCRAFT ELECTRICAL SYSTEMS--The student will be able to:

31.01 Repair and inspect aircraft electrical system components; crimp and splice wiring to manufacturers' specifications; and repair pins and sockets of aircraft connectors. [FAA FAR Part 147, Level 2]
31.02 Install, check, and service airframe electric wiring, controls, switches, indicators, and protective devices. [FAA FAR Part 147, Level 3]
31.03 Inspect, check, troubleshoot, service, and repair alternating and direct current electrical systems. [FAA FAR Part 147, Level 3]
31.04 Inspect, check, and troubleshoot constant and integrated speed-drive generators. [FAA FAR Part 147, Level 1]
31.05 Identify and utilize appropriate electrical tools and equipment.

32.0 INSPECT AND REPAIR POSITION AND WARNING SYSTEMS--The student will be able to:

32.01 Inspect, check, and service speed and configuration warning systems, electrical brake controls, and antiskid systems. [FAA FAR Part 147, Level 2]
32.02 Inspect, check, troubleshoot, and service landing-gear position- indicating and warning systems. [FAA FAR Part 147, Level 3]

33.0 MAINTAIN ICE AND RAIN CONTROL SYSTEMS--The student will be able to:

33.01 Inspect, check, troubleshoot, service, and repair airframe ice and rain control systems. [FAA FAR Part 147, Level 2]

34.0 INSPECT AND REPAIR AIRCRAFT FIRE-PROTECTION SYSTEMS--The student will be able to:

34.01 Inspect, check, and service smoke and carbon monoxide detection systems. [FAA FAR Part 147, Level 1]

34.02 Inspect, check, service, troubleshoot, and repair aircraft fire detection and extinguishing systems. [FAA FAR Part 147, Level 3]

35.0 DEMONSTRATE KNOWLEDGE OF FEDERAL AVIATION ADMINISTRATION AIRFRAME LICENSING REQUIREMENTS--The student will be able to:

35.01 Explain the requirements for obtaining FAA authorization to take the FAA Airframe examinations.

36.0 DEMONSTRATE EMPLOYABILITY SKILLS AS AN AVIATION MAINTENANCE TECHNICIAN (AMT) WITH AN FAA AIRFRAME RATING--The student will be able to:

36.01 Conduct a job search for an AMT with FAA airframe rating position.

36.02 Secure information about the requirements for an AMT with FAA airframe rating in a particular firm.

36.03 Identify documents that may be required when applying for an AMT with FAA airframe rating position.

36.04 Complete a job-application form correctly.

36.05 Demonstrate competency in job-interview techniques.

36.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other employees.

36.07 Identify or adopt acceptable work habits.

36.08 Demonstrate knowledge of how to make job changes appropriately.

36.09 Demonstrate acceptable employee health habits.

36.10 Demonstrate a knowledge of the Florida "Right-to-Know" law, Florida Statutes, Chapter 442.

37.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP RELATED OPPORTUNITIES IN AVIATION AIRFRAME MAINTENANCE OCCUPATIONS--The student will be able to:

37.01 Define entrepreneurship.

37.02 Describe the importance of entrepreneurship to aviation airframe maintenance occupations.

37.03 List the advantages and disadvantages of aviation airframe maintenance business ownership.

37.04 Identify the risks involved in ownership of an aviation airframe maintenance business.

37.05 Identify the necessary personal characteristics of a successful aviation airframe maintenance business owner.

37.06 Identify the business skills needed to operate an aviation airframe maintenance business efficiently and effectively.

Program Title: Aircraft Power Plant Mechanic

July 1997

Florida Department of Education
INTENDED OUTCOMES

	PSAV
Program Number	**I470622**
CIP Number	0647060800
Grade level	30, 31
Length	1,440 Hours
Certification	AIR MECH @7G
Basic-Skills Grade Level	
Math	9
Language	9
Reading	9

INTENDED OUTCOMES: After successfully completing the appropriate courses for each occupational completion point in this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Aviation General Maintenance Technician Helper--Industry Title

01.0 Perform basic electricity skills.
02.0 Perform basic aircraft drawing skills.
03.0 Demonstrate aircraft weight and balance skills.
04.0 Maintain aircraft fluid lines and fittings.
05.0 Perform aircraft materials and processes skills.
06.0 Perform ground operations and servicing duties.
07.0 Perform cleaning and corrosion control operations.
08.0 Demonstrate mathematical skills.
09.0 Maintain forms and records.
10.0 Apply basic physics to aircraft systems.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate the use of maintenance publications.
13.0 Interpret mechanic privileges and limitations.
14.0 Identify Federal Aviation Administration licensing requirements.
15.0 Demonstrate appropriate communication skills.
16.0 Demonstrate employability skills as an aviation general maintenance technician helper.
17.0 Demonstrate an understanding of entrepreneurship related to opportunities in aviation general maintenance occupations.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Aviation Maintenance Technician with FAA Powerplant Rating--Industry Title

18.0 Perform basic reciprocating engine skills.
19.0 Perform basic turbine engine skills.
20.0 Perform engine inspection.
21.0 Maintain engine instrument systems.
22.0 Maintain engine fire-protection systems.
23.0 Maintain engine electrical systems.

24.0 Maintain lubrication systems.
25.0 Maintain ignition systems.
26.0 Maintain fuel-metering systems.
27.0 Maintain engine fuel systems.
28.0 Maintain induction systems.
29.0 Maintain engine cooling systems.
30.0 Maintain engine exhaust and reverser systems.
31.0 Maintain aircraft propellers.
32.0 Demonstrate knowledge of FAA Powerplant licensing requirements.
33.0 Demonstrate employability skills for an aviation maintenance technician with an FAA powerplant rating.
34.0 Demonstrate an understanding of entrepreneurship opportunities in aviation powerplant maintenance occupations.

STUDENT PERFORMANCE STANDARDS

Program Title: Aircraft Power Plant Mechanic
Secondary Number:
Postsecondary Number: I470622

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Aviation General Maintenance Technician Helper--Industry Title

01.0 PERFORM BASIC ELECTRICITY SKILLS--The student will be able to:

- 01.01 Calculate and measure capacitance and inductance. [FAA FAR Part 147, Level 2]
- 01.02 Calculate and measure electrical power. [FAA FAR Part 147, Level 2]
- 01.03 Measure voltage, current, resistance, and continuity. [FAA FAR Part 147, Level 3]
- 01.04 Determine the relationship of voltage, current, and resistance in electrical circuits. [FAA FAR Part 147, Level 3]
- 01.05 Read and interpret aircraft electrical-circuit diagrams, including solid-state devices and logic functions. [FAA FAR Part 147, Level 3]
- 01.06 Inspect and service batteries. [FAA FAR Part 147, Level 3]
- 01.07 Utilize proper electrical safety procedures.

02.0 PERFORM BASIC AIRCRAFT DRAWING SKILLS--The student will be able to:

- 02.01 Use aircraft drawings, symbols, and system schematics. [FAA FAR Part 147, Level 2]
- 02.02 Draw sketches of repairs and alterations. [FAA FAR Part 147, Level 3]
- 02.03 Use blueprint information.[FAA FAR Part 147, Level 3]
- 02.04 Use graphs and charts.[FAA FAR Part 147, Level 3]

03.0 DEMONSTRATE AIRCRAFT WEIGHT AND BALANCE SKILLS--The student will be able to:

- 03.01 Weigh aircraft. [FAA FAR Part 147, Level 2]
- 03.02 Perform complete weight-and-balance check and record data. [FAA FAR Part 147, Level 3]
- 03.03 Utilize proper personal safety procedures.

04.0 MAINTAIN AIRCRAFT FLUID LINES AND FITTINGS--The student will be able to:

- 04.01 Fabricate and install rigid and flexible fluid lines and fittings. [FAA FAR Part 147, Level 3]
- 04.02 Identify and utilize special fluid-line tools.
- 04.03 Utilize proper personal safety procedures for fluid lines and fittings.

05.0 PERFORM AIRCRAFT MATERIALS AND PROCESSES SKILLS--The student will be able to:

05.01 Identify and select appropriate nondestructive testing methods. [FAA FAR Part 147, Level 1]
05.02 Perform dye penetrant, eddy current, ultrasonic, and magnetic particle inspections. [FAA FAR Part 147, Level 2]
05.03 Perform basic heat-testing processes. [FAA FAR Part 147, Level 1]
05.04 Identify and select aircraft hardware and materials. [FAA FAR Part 147, Level 3]
05.05 Inspect and check welds. [FAA FAR Part 147, Level 3]
05.06 Perform precision measurements. [FAA FAR Part 147, Level 3]
05.07 Perform safety wiring techniques.

06.0 PERFORM GROUND OPERATIONS AND SERVICING DUTIES--The student will be able to:

06.01 Start, ground-operate, move, service, and secure aircraft and identify typical ground operations hazards. [FAA FAR Part 147, Level 2]
06.02 Identify and select fuels. [FAA FAR Part 147, Level 2]
06.03 Comply with prescribed shop and personal safety procedures.

07.0 PERFORM CLEANING AND CORROSION CONTROL OPERATIONS--The student will be able to:

07.01 Identify and select cleaning materials. [FAA FAR Part 147, Level 3]
07.02 Inspect, identify, remove, and treat aircraft corrosion and perform aircraft cleaning. [FAA FAR Part 147, Level 3]
07.03 Identify and utilize appropriate equipment for cleaning and corrosion control.
07.04 Observe appropriate personal safety procedures for corrosive chemicals.

08.0 DEMONSTRATE MATHEMATICAL SKILLS--The student will be able to:

08.01 Extract roots and raise numbers to a given power. [FAA FAR Part 147, Level 3]
08.02 Determine areas and volumes of various geometrical shapes by solving problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders. [FAA FAR Part 147, Level 3]
08.03 Solve ratio, proportion, and percentage problems. [FAA FAR Part 147, Level 3]
08.04 Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers. [FAA FAR Part 147, Level 3]
08.05 Measure tolerances on horizontal and vertical surfaces using millimeters, centimeters, feet, and inches.
08.06 Identify costs, prices, and taxes for the purchase and sale of materials that may be required when performing the duties of an Aviation Maintenance Technician.

09.0 MAINTAIN FORMS AND RECORDS--The student will be able to:

09.01 Write descriptions of work performed including aircraft discrepancies and corrective actions using typical aircraft maintenance records.[FAA FAR Part 147, Level 3]

09.02 Complete required maintenance forms, records, and inspection reports.[FAA FAR Part 147, Level 3]

10.0 APPLY BASIC PHYSICS TO AIRCRAFT SYSTEMS--The student will be able to:

10.01 Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight. [FAA FAR Part 147, Level 2]

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

11.02 Draw conclusions or make inferences from data.

11.03 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials and know the proper precautions required for handling such materials.

11.04 Understand pressure measurement in terms of PSI, inches of mercury, and KPA.

12.0 DEMONSTRATE THE USE OF MAINTENANCE PUBLICATIONS--The student will be able to:

12.01 Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material.[FAA FAR Part 147, Level 3]

12.02 Read technical data.[FAA FAR Part 147, Level 3]

13.0 INTERPRET MECHANIC PRIVILEGES AND LIMITATIONS--The student will be able to:

13.01 Exercise mechanic privileges within the limitations prescribed by Part 65 of this chapter.[FAA FAR Part 147, Level 3]

14.0 IDENTIFY FEDERAL AVIATION ADMINISTRATION LICENSING REQUIREMENTS--The student will be able to:

14.01 Identify the information in Federal Aviation Regulations (FAR) Part 65 pertaining to eligibility for Aviation Maintenance Technician (AMT) certification and ratings.

14.02 Identify the FAA requirements that must be satisfied in order to display the FAA Airframe and Powerplant license.

15.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

15.01 Write logical and understandable statements, or phrases, to accurately complete forms/invoices commonly used in business and industry.
15.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
15.03 Read and follow written and oral instructions.
15.04 Answer and ask questions coherently and concisely.
15.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
15.06 Demonstrate appropriate telephone/communication skills.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS AS AN AVIATION GENERAL MAINTENANCE TECHNICIAN HELPER--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Identify documents that may be required when applying for a job position.
16.04 Complete a job-application form correctly.
16.05 Demonstrate job-interview skills.
16.06 Identify appropriate responses to criticism from employer, supervisor, or other employees.
16.07 Identify work habits for getting and keeping a job.
16.08 Explain how to make job changes.
16.09 Explain the purpose of the Florida "Right-to-Know" law, Florida Statutes, Chapter 442.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP RELATED TO OPPORTUNITIES IN AVIATION GENERAL MAINTENANCE OCCUPATIONS--The student will be able to:

17.01 Define entrepreneurship.
17.02 Describe the importance of entrepreneurship to the United States economy.
17.03 List the advantages and disadvantages of business ownership.
17.04 Identify the risks involved in ownership of a business.
17.05 Identify the necessary personal characteristics of a successful entrepreneur.
17.06 Identify the business skills needed to operate a small business efficiently and effectively.

OCCUPATIONAL COMPLETION POINT - DATA CODE B

Aviation Maintenance Technician with FAA Powerplant Rating--Industry Title

18.0 PERFORM BASIC RECIPROCATING ENGINE SKILLS--The student will be able to:

18.01 Inspect and repair a radial engine.[FAA FAR Part 147, Level 1]
18.02 Overhaul a reciprocating engine.[FAA FAR Part 147, Level 2]
18.03 Inspect, check, service, and repair reciprocating engines and reciprocating. [FAA FAR Part 147, Level 3]
18.04 Install, troubleshoot, and remove reciprocating engines.[FAA FAR Part 147, Level 3]

19.0 PERFORM BASIC TURBINE ENGINE SKILLS--The student will be able to:

19.01 Overhaul a turbine engine. [FAA FAR Part 147, Level 2]
19.02 Inspect, check, service, and repair turbine engines and turbine engine installations. [FAA FAR Part 147, Level 3]
19.03 Install, troubleshoot, and remove turbine engines. [FAA FAR Part 147, Level 3]
19.04 Inspect and troubleshoot unducted fan systems and components. [FAA FAR Part 147, Level 1]
19.05 Inspect, check, service, and troubleshoot turbine-driven auxiliary power units. [FAA FAR Part 147, Level 1]

20.0 PERFORM ENGINE INSPECTION--The student will be able to:

20.01 Perform powerplant conformity and airworthiness inspections. [FAA FAR Part 147, Level 3]

21.0 MAINTAIN ENGINE INSTRUMENT SYSTEMS--The student will be able to:

21.01 Troubleshoot, service, and repair electrical and mechanical fluid rate-of-flow indicating systems. [FAA FAR Part 147, Level 2]
21.02 Inspect, check, service, troubleshoot, and repair electrical and mechanical engine temperature-, pressure-, and rpm-indicating systems. [FAA FAR Part 147, Level 3]

22.0 MAINTAIN ENGINE FIRE-PROTECTION SYSTEMS--The student will be able to:

22.01 Inspect, check, service, troubleshoot, and repair engine fire-detection and extinguishing systems. [FAA FAR Part 147, Level 3]

23.0 MAINTAIN ENGINE ELECTRICAL SYSTEMS--The student will be able to:

23.01 Repair engine electrical system components. [FAA FAR Part 147, Level 2]
23.02 Install, check, and service engine electrical wiring, controls, switches, indicators, and protective devices. [FAA FAR Part 147, Level 3]

24.0 MAINTAIN LUBRICATION SYSTEMS--The student will be able to:

24.01 Identify and select lubricants. [FAA FAR Part 147, Level 2]
24.02 Repair engine lubrication system components. [FAA FAR Part 147, Level 2]
24.03 Inspect, check, service, troubleshoot, and repair engine lubrication systems. [FAA FAR Part 147, Level 3]

25.0 MAINTAIN IGNITION SYSTEMS--The student will be able to:

25.01 Overhaul magneto and ignition harness. [FAA FAR Part 147, Level 2]
25.02 Inspect, service, troubleshoot, and repair reciprocating and turbine engine ignition systems and components. [FAA FAR Part 147, Level 2]

25.03 Inspect, service, troubleshoot, and repair turbine engine electrical starting systems. [FAA FAR Part 147, Level 3]

25.04 Inspect, service, and troubleshoot turbine engine pneumatic starting systems. [FAA FAR Part 147, Level 1]

26.0 MAINTAIN-FUEL METERING SYSTEMS--The student will be able to:

26.01 Troubleshoot and adjust turbine engine fuel-metering systems and electronic-engine fuel controls. [FAA FAR Part 147, Level 1]

26.02 Overhaul carburetor. [FAA FAR Part 147, Level 2]

26.03 Repair engine fuel-metering system components. [FAA FAR Part 147, Level 2]

26.04 Inspect, check, service, troubleshoot, and repair reciprocating and turbine engine fuel-metering systems. [FAA FAR Part 147, Level 3]

27.0 MAINTAIN ENGINE FUEL SYSTEMS--The student will be able to:

27.01 Repair engine fuel system components. [FAA FAR Part 147, Level 2]

27.02 Inspect, check, service, troubleshoot, and repair engine fuel systems. [FAA FAR Part 147, Level 3]

28.0 MAINTAIN INDUCTION SYSTEMS--The student will be able to:

28.01 Inspect, check, troubleshoot, service, and repair engine ice and rain control systems. [FAA FAR Part 147, Level 2]

28.02 Inspect, check, service, troubleshoot, and repair heat exchangers, superchargers, and turbine engine airflow and temperature control systems. [FAA FAR Part 147, Level 1]

28.03 Inspect, check, service, and repair carburetor air intake and induction manifolds. [FAA FAR Part 147, Level 3]

29.0 MAINTAIN ENGINE COOLING SYSTEMS--The student will be able to:

29.01 Repair engine cooling system components. [FAA FAR Part 147, Level 2]

29.02 Inspect, check, troubleshoot, service, and repair engine cooling systems. [FAA FAR Part 147, Level 3]

30.0 MAINTAIN ENGINE EXHAUST AND REVERSER SYSTEMS--The student will be able to:

30.01 Repair engine exhaust system components. [FAA FAR Part 147, Level 2]

30.02 Inspect, check, troubleshoot, service, and repair engine exhaust systems. [FAA FAR Part 147, Level 3]

30.03 Troubleshoot and repair engine thrust reverser systems and related components. [FAA FAR Part 147, Level 1]

31.0 MAINTAIN AIRCRAFT PROPELLERS--The student will be able to:

31.01 Inspect, check, service, and repair propeller synchronizing and ice control systems. [FAA FAR Part 147, Level 1]
31.02 Identify and select propeller lubricants. [FAA FAR Part 147, Level 2]
31.03 Balance propellers. [FAA FAR Part 147, Level 1]
31.04 Repair propeller control system components. [FAA FAR Part 147, Level 2]
31.05 Inspect, check, service, and repair fixed-pitch, constant-speed, feathering propellers, and propeller-governing systems. [FAA FAR Part 147, Level 3]
31.06 Install, troubleshoot, and remove propellers. FAA FAR Part 147, Level 3]
31.07 Repair aluminum alloy propeller blades. [FAA FAR Part 147, Level 3]

32.0 DEMONSTRATE KNOWLEDGE OF FEDERAL AVIATION ADMINISTRATION POWERPLANT LICENSING REQUIREMENTS--The student will be able to:

32.01 Explain the requirements for obtaining FAA authorization to take the FAA Powerplant examinations.

33.0 DEMONSTRATE EMPLOYABILITY SKILLS FOR AN AVIATION MAINTENANCE TECHNICIAN (AMT) WITH AN FAA POWERPLANT RATING--The student will be able to:

33.01 Conduct a job search for an AMT position.
33.02 Secure information about the requirements for an AMT in a particular firm.
33.03 Identify documents that may be required when applying for an AMT position.
33.04 Complete a job-application form correctly.
33.05 Demonstrate competency in job-interview techniques.
33.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other employees.
33.07 Identify or adopt acceptable AMT work habits.
33.08 Demonstrate knowledge of how to make job changes appropriately.
33.09 Demonstrate acceptable employee health habits.
33.10 Demonstrate a knowledge of the Florida "Right-to-Know" law, Florida Statutes, Chapter 442.

34.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP RELATED TO OPPORTUNITIES IN AVIATION POWERPLANT MAINTENANCE OCCUPATIONS--The student will be able to:

34.01 Define entrepreneurship.
34.02 Describe the importance of entrepreneurship to the aviation maintenance industry.
34.03 List the advantages and disadvantages of aviation maintenance business ownership.
34.04 Identify the risks involved in ownership of an aviation maintenance business.
34.05 Identify the necessary personal characteristics of a successful aviation maintenance business owner.
34.06 Identify the business skills needed to operate an aviation maintenance business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Avionics
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I470199**
CIP Number	0647.019901
Grade Level	30, 31
Length	1800-2000 hours
Certification	AVIONICS @7 G
	ELECTRONIC @7 G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as radio mechanics (85514608) and as avionics technicians (823.281-010). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content includes, but is not limited to, troubleshooting, repair and installation of airborne radio communications, radio navigation and radar equipment systems in accordance with regulatory and industry standards. Also included is instruction in basics of AM and FM transmitters and receivers and avionics equipment. Skills preparation for passing licensing/certification tests required by industry forms an integral part of the curriculum.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Avionics industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan signed by the student, teacher and

employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; and a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.
Electronic Technology and/or Electronic Engineering Technology are prerequisites for entry into this electronic specialization. Algebra is recommended as a prerequisite for entry into this program.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 10.0, Language 10.0, Reading 10.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1800-2000 hours when content from the Florida common core electronics program (Electronics Technology) is included.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in AM and FM transmitters.
02.0 Demonstrate proficiency in AM and FM receivers.
03.0 Demonstrate proficiency in AM and FM transceivers.
04.0 Demonstrate proficiency in electromagnetic wave emissions.
05.0 Demonstrate proficiency in avionics radio repair station regulations and procedures.
06.0 Demonstrate proficiency in aircraft electrical systems and ground safety.
07.0 Demonstrate proficiency in line and bench maintenance of airborne communication systems.
08.0 Demonstrate proficiency in line and bench maintenance of airborne radio navigation systems and equipment.
09.0 Demonstrate proficiency in line and bench maintenance of airborne radar systems.
10.0 Demonstrate proficiency in the principles of operation of area navigation (R-NAV) systems.
11.0 Demonstrate proficiency in installing avionics systems.
12.0 Demonstrate proficiency in the calibration of test equipment.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate appropriate math skills.
15.0 Demonstrate appropriate understanding of basic science.
16.0 Demonstrate employability skills.

17.0 Demonstrate an understanding of entrepreneurship.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Avionics
Secondary Number:
Postsecondary Number: I470199

01.0 DEMONSTRATE PROFICIENCY IN AM AND FM TRANSMITTERS--The student will be able to:

- 01.01 Define DSB, SSB and FM modulation.
- 01.02 Draw, analyze, and troubleshoot AM and FM RF oscillator circuits.
- 01.03 Draw, analyze, and troubleshoot buffer and multiplier circuits.
- 01.04 Draw, analyze, and troubleshoot RF power amplifier circuits.
- 01.05 Draw, analyze, and troubleshoot AM and FM modulation circuits.
- 01.06 Draw, analyze, and troubleshoot microphone circuits.
- 01.07 Draw, analyze, and troubleshoot balanced modulators and SSB filter circuits.
- 01.08 Draw, analyze and troubleshoot AM and FM power supply circuits.
- 01.09 Make power, frequency, and modulation measurements of AM and FM transmitters.
- 01.10 Align and troubleshoot AM and FM transmitters.
- 01.11 Describe FCC rules pertaining to AM and FM transmitter maintenance and operation.

02.0 DEMONSTRATE PROFICIENCY IN AM AND FM RECEIVERS--The student will be able to:

- 02.01 Draw, analyze, and troubleshoot receiver audio voltage and power amplifiers and speaker/headphone circuits.
- 02.02 Draw, analyze, and troubleshoot AM and FM detector circuits.
- 02.03 Draw, analyze, and troubleshoot AM IF amplifier circuits.
- 02.04 Draw, analyze, and troubleshoot FM IF amplifier and limited circuits.
- 02.05 Draw, analyze, and troubleshoot receiver oscillator and AFC circuits.
- 02.06 Draw, analyze, and troubleshoot RF mixer/hetrodyne circuits.
- 02.07 Draw, analyze, and troubleshoot receiver RF amplifier circuits.
- 02.08 Draw, analyze, and troubleshoot AVC/AGC circuits.
- 02.09 Draw, analyze, and troubleshoot receiver power supplies.
- 02.10 Make receiver sensitivity, selectivity, bandwidth, image rejection, and adjacent channel rejection measurements.
- 02.11 Align and troubleshoot AM and FM receivers.

03.0 DEMONSTRATE PROFICIENCY IN AM AND FM TRANSCEIVERS--The student will be able to:

- 03.01 Analyze and troubleshoot transceiver control, metering, and switching circuits.
- 03.02 Analyze and troubleshoot transceiver frequency synthesizers and phase locked loop circuits.
- 03.03 Analyze and troubleshoot squelch circuits.

03.04 Align and troubleshoot transceivers.

04.0 DEMONSTRATE PROFICIENCY IN ELECTROMAGNETIC WAVE EMISSIONS--The student will be able to:

04.01 Define the radio frequency spectrum.
04.02 Define types and classification of RF emissions.
04.03 Define the characteristics of radio waves.
04.04 Define radio wave propagation method.
04.05 Define the basic types of antennas.
04.06 Draw the voltage and current relationships and radiation patterns for the basic types of antennas.
04.07 Solve signal strength problems and measure signal strength.
04.08 Solve problems pertaining to antenna length, propagation velocity, and frequency.
04.09 Define methods for antenna tuning, gain, and directivity.
04.10 Define transmission lines in terms of electrical and physical properties.
04.11 Define standing waves, cause and effect, and measure standing wave ratios.
04.12 Define tuned transmission lines and describe applications.
04.13 Draw voltage, current, and impedance relationships for tuned transmission lines.
04.14 Compute transmission line losses.
04.15 Construct transmission lines.
04.16 Define waveguides, resonant cavities and their applications.

05.0 DEMONSTRATE PROFICIENCY IN AVIONICS RADIO REPAIR STATION REGULATIONS AND PROCEDURES--The student will be able to:

05.01 Define repair station related regulatory and standardization agencies and their purposes.
05.02 Define repair station certification requirements.
05.03 Define requirements for certification of radio repairmen.
05.04 Practice proper station operation procedures.
05.05 Prepare repair station reports and documentation.

06.0 DEMONSTRATE PROFICIENCY IN AIRCRAFT ELECTRICAL SYSTEMS AND GROUND SAFETY--The student will be able to:

06.01 Define standard aircraft bus voltage.
06.02 Analyze aircraft electrical power generation and charging systems.
06.03 Analyze aircraft electrical power control and distribution systems.
06.04 Analyze aircraft electrical warning systems.
06.05 Analyze aircraft ignition systems.
06.06 Describe and practice aircraft ground handling safety procedures pertaining to avionics maintenance.

07.0 DEMONSTRATE PROFICIENCY IN LINE AND BENCH MAINTENANCE OF AIRBORNE COMMUNICATION SYSTEMS--The student will be able to:

07.01 Describe theory of operation of air to ground communication systems.

07.02 Determine serviceability through performance checks of avionics communication systems.

07.03 Troubleshoot to the component/module level malfunctioning communication systems/equipment.

07.04 Repair and return to service air to ground communication systems/equipment.

07.05 Analyze and troubleshoot communication transmitter switching and audio distribution circuits and equipment.

07.06 Describe the theory of operation of emergency locator transmitters (ELTs).

07.07 Perform preventive and regulatory maintenance and performance tests on ELTs.

07.08 Troubleshoot defective ELTs, repair, and return to service.

08.0 DEMONSTRATE PROFICIENCY IN LINE AND BENCH MAINTENANCE OF AIRBORNE RADIO NAVIGATION SYSTEMS AND EQUIPMENT--The student will be able to:

08.01 Describe the principles and theory of operation of VHF omnirange receivers, converters, and indicators.

08.02 Determine through performance checks, the serviceability of VHF omnirange systems.

08.03 Troubleshoot to the component/module level malfunctioning omnirange systems.

08.04 Repair and return to service omnirange systems equipment.

08.05 Describe the principles and theory of operation of instrument landing systems (ILS).

08.06 Determine through performance checks the serviceability of localizer, glideslope, and marker beacon receivers, converters, and indicators.

08.07 Troubleshoot to the component/module level malfunctioning ILS systems and equipment.

08.08 Repair and return to service ILS systems and equipment.

08.09 Describe the principles of operation of microwave landing systems.

08.10 Describe the principles and theory of operation of Automatic Direction Finders (ADF).

08.11 Determine through performance checks the serviceability of ADF systems.

08.12 Troubleshoot to the component/module level malfunctioning ADF systems.

08.13 Repair and return to service ADF systems.

08.14 Describe radio navigation systems/equipment interface with other aircraft instruments and systems.

09.0 DEMONSTRATE PROFICIENCY IN LINE AND BENCH MAINTENANCE OF AIRBORNE RADAR SYSTEMS--The student will be able to:

09.01 Describe the principles and theory of operation of Air Traffic Control (ATC) transponders and altitude encoders.

09.02 Determine through performance checks the serviceability of ATC transponders and altitude encoders.

09.03 Troubleshoot to the component/module level ATC transponders.

09.04 Repair and return to service ATC transponders.
09.05 Describe the principles and theory of operation and Distance Measurements Equipment (DME).
09.06 Determine through performance checks the serviceability of DME systems.
09.07 Troubleshoot to the component/module level malfunctioning DME systems.
09.08 Repair and return to service DME systems.
09.09 Describe the principles and basic theory of operation of weather radar systems.
09.10 Describe the basic principles of operation of the 3M/RYAN Stormscope.

10.0 DEMONSTRATE PROFICIENCY IN THE PRINCIPLES OF OPERATION OF AREA NAVIGATION (R-NAV) SYSTEMS--The student will be able to:

10.01 Describe the principles of operation of VHF R-Nav systems (VOR-DME).
10.02 Describe the principles of operation of hyperbolic R-Nav systems (Loran C) (Omega/VAF).

11.0 DEMONSTRATE PROFICIENCY IN INSTALLING AVIONICS SYSTEMS--The student will be able to:

11.01 Draw an interconnecting diagram and interconnect an IFR Avionics system for a single engine or light twin aircraft using acceptable methods, techniques, and practices.
11.02 Determine proper placement of the various antennas required for an IFR Avionics package on a light twin or single engine aircraft.
11.03 Describe the effects of precipitation static on aircraft radios and standard methods of reduction.
11.04 Compute the dimensions of an ADF Sense antenna for a typical installation.
11.05 Apply the formula for weight and balance computation.

12.0 DEMONSTRATE PROFICIENCY IN THE CALIBRATION OF TEST EQUIPMENT--The student will be able to:

12.01 Describe the regulatory requirements for repair station test equipment calibration.
12.02 Calibrate frequency counters/meters.
12.03 Calibrate general purpose multimeters.
12.04 Calibrate RF voltmeters.
12.05 Calibrate RF powermeters, wattmeters, loads, and attenuators.
12.06 Calibrate audio signal generators and power meters.
12.07 Calibrate oscilloscopes.
12.08 Calibrate power supplies.
12.09 Calibrate RF signal generators.
12.10 Calibrate special purpose test sets normally used in an Avionics Repair Station.

13.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

13.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
13.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
13.03 Read and follow written and oral instructions.
13.04 Answer and ask questions coherently and concisely.
13.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
13.06 Demonstrate appropriate telephone/communication skills.

14.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

14.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
14.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
14.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
14.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
14.05 Demonstrate an understanding of federal, state and local taxes and their computation.

15.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

15.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
15.02 Draw conclusions or make inferences from data.
15.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
15.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Identify documents which may be required when applying for a job interview.
16.04 Complete a job application form correctly.
16.05 Demonstrate competence in job interview techniques.
16.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
16.07 Identify acceptable work habits.
16.08 Demonstrate knowledge of how to make appropriate job changes.
16.09 Demonstrate acceptable employee health habits.
16.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Identify characteristics of the American enterprise system.
17.02 Define inflation and deflation.
17.03 Illustrate the basic economic questions facing any society.
17.04 Determine the results of a change in demand or a change in supply.
17.05 List factors which contribute to economic growth.
17.06 Identify characteristics of different types of business ownership.
17.07 Choose appropriate action in a situation requiring application of business ethics.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Barbering
Occupational Area: Industrial Education

	Secondary	PSAV
Program Numbers	**8757100**	**I120402**
CIP Number	0612.040200	0612.040200
Grade Level	9-12, 30, 31	30, 31
Length	8 credits	1200 hours
Certification	BARBERING @7 G	BARBERING @7 G
	PERS SERV @7 G	PERS SERV @7 G

I. **PURPOSE**: The purpose of this program is to prepare students for employment as barbers (68002448), or to provide supplemental training for persons previously or currently employed in this occupation. Instruction is designed to qualify students for employment upon successfully passing the Florida Barber License Examination.

The content includes, but is not limited to, communication skills, leadership skills, human relations skills and employability skills, safe and efficient work practices; Florida barber law and rules, acquisition of knowledge of barber and its related chemistry, bacteriology, anatomy and physiology; development of skill in performing the manipulative technique required in the practice of barbering.

Listed below are the courses that comprise this program when offered at the secondary level:

8757110 - Barbering 1
8757120 - Barbering 2
8757130 - Barbering 3
8757140 - Barbering 4
8757150 - Barbering 5
8757160 - Barbering 6
8757170 - Barbering 7
8757180 - Barbering 8

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Barbering industry; planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Instruction and learning activities are provided in a laboratory setting using hands-on experience with tools and chemicals appropriate to the program content and in accordance with safety and sanitation practices in the trade.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 8.0, Language 8.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

When a student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards which the student must master to earn credit must be specified in the student's individual educational plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

When this program is offered at the postsecondary level it may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The length of this program is 1200 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate safe, sanitary and efficient work practices.
02.0 Identify and perform shampoo/hair conditioners and scalp treatment.
03.0 Identify and perform trimming/shaping hair.
04.0 Identify and perform hair styles.
05.0 Identify and prepare hair pieces, wigs and hair attachments.
06.0 Identify and perform permanent wave/reconstruction curl/chemical relaxing.
07.0 Identify and apply temporary/semi-permanent and permanent color/bleach and specialty color techniques.
08.0 Identify and perform mustache and beard styling.
09.0 Demonstrate shaving the face.
10.0 Identify and perform facial treatments.
11.0 Demonstrate appropriate understanding of basic science.

12.0 Demonstrate knowledge of professional development (employability skills).

13.0 Demonstrate and understanding of entrepreneurship.

14.0 Demonstrate knowledge of Florida law and State Board requirements.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Barbering
Secondary Number: 8757100
Postsecondary Number: I120402

01.0 DEMONSTRATE SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

- 01.01 Observe and apply sanitation and shop safety rules and practices in all skill procedures.
- 01.02 Set up and operate equipment and utilize materials.
- 01.03 Clean and maintain implements and equipment.
- 01.04 Demonstrate professional ethics with clients and co-workers.
- 01.05 Analyze and recognize hair, skin and scalp conditions.
- 01.06 Analyze hair, skin and scalp products using Ph scale.
- 01.07 Identify the histology/trichology of skin and hair.
- 01.08 Exhibit professional occupational skills.
- 01.09 Determine the need for and perform corrective services.

02.0 IDENTIFY AND PERFORM SHAMPOO/HAIR CONDITIONERS AND SCALP TREATMENT--The student will be able to:

- 02.01 Prepare the client for service.
- 02.02 Analyze and recognize hair and scalp condition.
- 02.03 Select appropriate products (shampoo, conditioners, scalp treatments).
- 02.04 Apply shampoo and manipulate to cleanse hair and scalp.
- 02.05 Rinse shampoo thoroughly from hair and scalp.
- 02.06 Select appropriate hair or scalp conditioners/treatment (reconstructor, acid rinse, moisturizer, detangler, oily scalp, dry scalp, or dandruff treatment).
- 02.07 Apply treatment or conditioner according to manufacturer's directions.
- 02.08 Perform scalp manipulation, if required.
- 02.09 Set up and operate electrical equipment as required (high frequency currents, ultra violet or infra red rays).
- 02.10 Remove conditioner or treatment, if required..

03.0 IDENTIFY AND PERFORM TRIMMING/SHAPING HAIR (CUTTING)--The student will be able to:

- 03.01 Prepare the client and determine needs and desires (consultation).
- 03.02 Select and utilize hair cutting implements and techniques scissors, razor, clippers, texturizing implements).
- 03.03 Section hair and proceed with wet or dry hair cut utilizing all elevations (solid form, graduated, layered, over-directed) and combinations with or without blends.
- 03.04 Edge and clean neckline with razor, clipper or scissors.
- 03.05 Check completed cut.

03.06 Sanitize cutting implements using Universal Sanitation Procedures.

04.0 IDENTIFY AND PERFORM HAIR STYLES--The student will be able to:

04.01 Prepare client and determine needs and desired style (consultation).
04.02 Identify and perform wet set using principles of design (hair sculpting, rollers and fingerwaves).
04.03 Prepare and perform thermal styling using electric rollers, blow dryers, curling irons, crimping irons, thermo-pressing combing, air-waving combs using principles of design.
04.04 Comb out into desired style.
04.05 Utilize braiding technique.

05.0 IDENTIFY AND PREPARE HAIR PIECES WIGS AND HAIR ATTACHMENTS--The student will be able to:

05.01 Determine and identify styles and colors of wigs and hair pieces.
05.02 Measure the head and fit wig or hair piece.
05.03 Clean, shape, and style to client's features.
05.04 Attach and blend hair pieces/extensions into desired style.

06.0 IDENTIFY AND PERFORM PERMANENT WAVING/RECONSTRUCTION CURL/CHEMICAL RELAXING--The student will be able to:

06.01 Prepare client and determine needs and desired style (consultation).
06.02 Analyze hair, check scalp.
06.03 Select appropriate solution strength according to hair texture, desired results.
06.04 Perform shampoo and shaping as required.
06.05 Apply protective cream or lotion.
06.06 Apply rearranger or straightener as required for desired results following curl or chemical relaxer.
06.07 Strand test for straightness if performing reconstruction curl or chemical relaxer.
06.08 Rinse or shampoo according to manufacturer's directions.
06.09 Select rods and wrap hair, if required, according to manufacturer's directions.
06.10 Apply processing solution and process, take test curls.
06.11 Rinse, blot, shampoo and/or neutralize.
06.12 Remove rods, condition and style, record results.
06.13 Apply leave-on treatment, if required. Record results.

07.0 IDENTIFY AND APPLY TEMPORARY/SEMI-PERMANENT AND PERMANENT COLOR/BLEACH AND SPECIALTY COLOR TECHNIQUES--The student will be able to:

07.01 Perform patch test (pre-disposition), if required.

07.02 Prepare patron, determine needs and desires (consultation).
07.03 Analyze scalp and hair.
07.04 Select and assemble appropriate solutions according to hair texture and desired results.
07.05 Section hair, if required.
07.06 Mix, if required, and apply color, toner, and/or bleach according to manufacturer's directions.
07.07 Perform strand tests.
07.08 Identify and perform specialty coloring techniques.
07.09 Shampoo before or after applying color according to manufacturer's directions. Record results.

08.0 IDENTIFY AND PERFORM MUSTACHE AND BEARD STYLING--The student will be able to:

08.01 Prepare the client.
08.02 Identify the design suitable mustache and/or beard style of the nose and face.
08.03 Perform the procedure for trimming a mustache or trimming a beard.
08.04 Remove clipped beard from face and neck.

09.0 DEMONSTRATE SHAVING THE FACE--The student will be able to:

09.01 Prepare client for shaving.
09.02 Perform the shaving of the client's face.
09.03 Perform the final cleansing of face and neck.

10.0 IDENTIFY AND PERFORM FACIAL TREATMENTS--The student will be able to:

10.01 Prepare the client.
10.02 Diagnose and identify skin condition.
10.03 Assemble supplies and equipment.
10.04 Cleanse face and neck.
10.05 Perform designated treatment (mechanical or manual).
10.06 Perform final cleansing of face and neck.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular reactions as a result of physical and chemical changes.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for ventilating and handling such materials.

12.0 DEMONSTRATE KNOWLEDGE OF PROFESSIONAL DEVELOPMENT (EMPLOYABILITY SKILLS)--The student will be able to:

12.01 Perform safety and health practices.

12.02 Locate and select employment opportunities.
12.03 Understand employment capabilities.
12.04 Demonstrate employment seeking skills.
12.05 Demonstrate appropriate work behavior.
12.06 Project a professional image.
12.07 Work individually and cooperatively as a member of regular or culturally diverse team.
12.08 Utilize communication skills applicable to the industry.
12.09 Utilize math skills applicable to the industry.
12.10 Adapt to change.
12.11 Balance personal and professional life.
12.12 Use and conserve resources and energy.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.
13.05 Identify the necessary personal characteristics of a successful entrepreneur.
13.06 Identify the business skills needed to operate a small business efficiently and effectively.

14.0 DEMONSTRATE KNOWLEDGE OF FLORIDA LAW AND STATE BOARD REQUIREMENTS--The student will be able to:

14.01 Demonstrate working knowledge of Florida Law, Chapter 477.
14.02 Demonstrate Universal HIV-AIDS Precaution Procedures for the salon and knowledge of appropriate behavior in dealing with persons who may have the virus or syndrome.
14.03 Demonstrate knowledge of the "Florida Right-to-Know" Law, Chapter 442.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757110
Course Title: Barbering 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in safety rules and procedures, school, classroom/laboratory procedures. It provides competencies in hair shampooing and conditioning, trimming and shaping hair using clippers, shears and razors.

01.0 DEMONSTRATE SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

- 01.01 Observe and apply sanitation and shop safety rules and practices in all skill procedures.
- 01.02 Set up and operate equipment and utilize materials.
- 01.03 Clean and maintain implements and equipment.
- 01.04 Demonstrate professional ethics with clients and co-workers.
- 01.05 Analyze and recognize hair, skin and scalp conditions.
- 01.06 Analyze hair, skin and scalp products using Ph scale.
- 01.07 Identify the histology/trichology of skin and hair.
- 01.08 Exhibit professional occupational skills.
- 01.09 Determine the need for and perform corrective services.

02.0 IDENTIFY AND PERFORM SHAMPOO/HAIR CONDITIONERS AND SCALP TREATMENT--The student will be able to:

- 02.01 Prepare the client for service.
- 02.02 Analyze and recognize hair and scalp condition.
- 02.03 Select appropriate products (shampoo, conditioners, scalp treatments).
- 02.04 Apply shampoo and manipulate to cleanse hair and scalp.
- 02.05 Rinse shampoo thoroughly from hair and scalp.
- 02.06 Select appropriate hair or scalp conditioners/treatment (reconstructor, acid rinse, moisturizer, detangler, oily scalp, dry scalp, or dandruff treatment).
- 02.07 Apply treatment or conditioner according to manufacturer's directions.
- 02.08 Perform scalp manipulation, if required.
- 02.09 Set up and operate electrical equipment as required (high frequency currents, ultra violet or infra red rays).
- 02.10 Remove conditioner or treatment, if required..

03.0 IDENTIFY AND PERFORM TRIMMING/SHAPING HAIR (CUTTING)--The student will be able to:

- 03.01 Prepare the client and determine needs and desires (consultation).

03.02 Select and utilize hair cutting implements and techniques scissors, razor, clippers, texturizing implements).

03.03 Section hair and proceed with wet or dry hair cut utilizing all elevations (solid form, graduated, layered, over-directed) and combinations with or without blends.

03.04 Edge and clean neckline with razor, clipper or scissors.

03.05 Check completed cut.

03.06 Sanitize cutting implements using Universal Sanitation Procedures.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular reactions as a result of physical and chemical changes.

11.02 Draw conclusions or make inferences from data.

11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for ventilating and handling such materials.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757120
Course Title: Barbering 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide competencies in hair styling and hair straightening.

01.0 DEMONSTRATE SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

- 01.01 Observe and apply sanitation and shop safety rules and practices in all skill procedures.
- 01.02 Set up and operate equipment and utilize materials.
- 01.03 Clean and maintain implements and equipment.
- 01.04 Demonstrate professional ethics with clients and co-workers.
- 01.05 Analyze and recognize hair, skin and scalp conditions.
- 01.06 Analyze hair, skin and scalp products using Ph scale.
- 01.07 Identify the histology/trichology of skin and hair.
- 01.08 Exhibit professional occupational skills.
- 01.09 Determine the need for and perform corrective services.

04.0 IDENTIFY AND PERFORM HAIR STYLES--The student will be able to:

- 04.01 Prepare client and determine needs and desired style (consultation).
- 04.02 Identify and perform wet set using principles of design (hair sculpting, rollers and fingerwaves).
- 04.03 Prepare and perform thermal styling using electric rollers, blow dryers, curling irons, crimping irons, thermo-pressing combing, air-waving combs using principles of design.
- 04.04 Comb out into desired style.
- 04.05 Utilize braiding technique.

06.0 IDENTIFY AND PERFORM PERMANENT WAVE/RECONSTRUCTION CURL/CHEMICAL RELAXING--The student will be able to:

- 06.01 Prepare client and determine needs and desired style (consultation).
- 06.02 Analyze hair, check scalp.
- 06.03 Select appropriate solution strength according to hair texture, desired results.
- 06.04 Perform shampoo and shaping as required.
- 06.05 Apply protective cream or lotion.
- 06.06 Apply rearranger or straightener as required for desired results following curl or chemical relaxer.
- 06.07 Strand test for straightness if performing reconstruction curl or chemical relaxer.

06.08 Rinse or shampoo according to manufacturer's directions.
06.09 Select rods and wrap hair, if required, according to manufacturer's directions.
06.10 Apply processing solution and process, take test curls.
06.11 Rinse, blot, shampoo and/or neutralize.
06.12 Remove rods, condition and style, record results.
06.13 Apply leave-on treatment, if required. Record results.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular reactions as a result of physical and chemical changes.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for ventilating and handling such materials.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757130
Course Title: Barbering 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide competencies in permanent waving of hair and preparation and styling of hair pieces and wigs.

01.0 DEMONSTRATE SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

- 01.01 Observe and apply sanitation and shop safety rules and practices in all skill procedures.
- 01.02 Set up and operate equipment and utilize materials.
- 01.03 Clean and maintain implements and equipment.
- 01.04 Demonstrate professional ethics with clients and co-workers.
- 01.05 Analyze and recognize hair, skin and scalp conditions.
- 01.06 Analyze hair, skin and scalp products using Ph scale.
- 01.07 Identify the histology/trichology of skin and hair.
- 01.08 Exhibit professional occupational skills.
- 01.09 Determine the need for and perform corrective services.

05.0 IDENTIFY AND PREPARE HAIR PIECES WIGS AND HAIR ATTACHMENTS--The student will be able to:

- 05.01 Determine and identify styles and colors of wigs and hair pieces.
- 05.02 Measure the head and fit wig or hair piece.
- 05.03 Clean, shape, and style to client's features.
- 05.04 Attach and blend hair pieces/extensions into desired style.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757140
Course Title: Barbering 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide competencies in all phases of hair coloring.

01.0 DEMONSTRATE SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

- 01.01 Observe and apply sanitation and shop safety rules and practices in all skill procedures.
- 01.02 Set up and operate equipment and utilize materials.
- 01.03 Clean and maintain implements and equipment.
- 01.04 Demonstrate professional ethics with clients and co-workers.
- 01.05 Analyze and recognize hair, skin and scalp conditions.
- 01.06 Analyze hair, skin and scalp products using Ph scale.
- 01.07 Identify the histology/trichology of skin and hair.
- 01.08 Exhibit professional occupational skills.
- 01.09 Determine the need for and perform corrective services.

07.0 IDENTIFY AND APPLY TEMPORARY/SEMI-PERMANENT AND PERMANENT COLOR/BLEACH AND SPECIALTY COLOR TECHNIQUES--The student will be able to:

- 07.01 Perform patch test (pre-disposition), if required.
- 07.02 Prepare client, determine needs and desires (consultation).
- 07.03 Analyze scalp and hair.
- 07.04 Select and assemble appropriate solutions according to hair texture and desired results.
- 07.05 Section hair, if required.
- 07.06 Mix, if required, and apply color, toner, and/or bleach according to manufacturer's directions.
- 07.07 Perform strand tests.
- 07.08 Identify and perform specialty coloring techniques.
- 07.09 Shampoo before or after applying color according to manufacturer's directions. Record results.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 11.01 Understand molecular reactions as a result of physical and chemical changes.
- 11.02 Draw conclusions or make inferences from data.
- 11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for ventilating and handling such materials.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757150
Course Title: Barbering 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide the student with an opportunity to develop competencies in mustache and beard styling.

01.0 DEMONSTRATE SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

- 01.01 Observe and apply sanitation and shop safety rules and practices in all skill procedures.
- 01.02 Set up and operate equipment and utilize materials.
- 01.03 Clean and maintain implements and equipment.
- 01.04 Demonstrate professional ethics with clients and co-workers.
- 01.05 Analyze and recognize hair, skin and scalp conditions.
- 01.06 Analyze hair, skin and scalp products using Ph scale.
- 01.07 Identify the histology/trichology of skin and hair.
- 01.08 Exhibit professional occupational skills.
- 01.09 Determine the need for and perform corrective services.

08.0 IDENTIFY AND PERFORM MUSTACHE AND BEARD STYLING--The student will be

- 08.01 Prepare the client.
- 08.02 Identify the design suitable mustache and/or beard style of the nose and face.
- 08.03 Perform the procedure for trimming a mustache or trimming a beard.
- 08.04 Remove clipped beard from face and neck.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757160
Course Title: Barbering 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide the student with an opportunity to develop competencies in shaving the face and face, neck and scalp massage and facial treatments.

01.0 DEMONSTRATE SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

- 01.01 Observe and apply sanitation and shop safety rules and practices in all skill procedures.
- 01.02 Set up and operate equipment and utilize materials.
- 01.03 Clean and maintain implements and equipment.
- 01.04 Demonstrate professional ethics with clients and co-workers.
- 01.05 Analyze and recognize hair, skin and scalp conditions.
- 01.06 Analyze hair, skin and scalp products using Ph scale.
- 01.07 Identify the histology/trichology of skin and hair.
- 01.08 Exhibit professional occupational skills.
- 01.09 Determine the need for and perform corrective services.

09.0 DEMONSTRATE SHAVING THE FACE--The student will be able to:

- 09.01 Prepare patron for shaving.
- 09.02 Perform the shaving of the patron's face.
- 09.03 Perform the final cleansing of face and neck.

10.0 IDENTIFY AND PERFORM FACIAL TREATMENTS--The student will be able to:

- 10.01 Prepare the patron.
- 10.02 Diagnose and identify skin condition.
- 10.03 Assemble supplies and equipment.
- 10.04 Cleanse face and neck.
- 10.05 Perform designated treatment (mechanical or manual).
- 10.06 Perform final cleansing of face and neck.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 11.01 Understand molecular reactions as a result of physical and chemical changes.
- 11.02 Draw conclusions or make inferences from data.
- 11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for ventilating and handling such materials.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757170
Course Title: Barbering 7
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide the student with an opportunity to develop competencies in barber management skills.

12.0 DEMONSTRATE KNOWLEDGE OF PROFESSIONAL DEVELOPMENT (EMPLOYABILITY SKILLS)--The student will be able to:

12.01 Perform safety and health practices.
12.02 Locate and select employment opportunities.
12.03 Understand employment capabilities.
12.04 Demonstrate employment seeking skills.
12.05 Demonstrate appropriate work behavior.
12.06 Project a professional image.
12.07 Work individually and cooperatively as a member of regular or culturally diverse team.
12.08 Utilize communication skills applicable to the industry.
12.09 Utilize math skills applicable to the industry.
12.10 Adapt to change.
12.11 Balance personal and professional life.
12.12 Use and conserve resources and energy.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757180
Course Title: Barbering 8
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide the student with an opportunity to develop competencies in employability skills and the study of the barbering law and rules. The student will be knowledgeable to the requirements of the state board examination.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 13.01 Define entrepreneurship.
- 13.02 Describe the importance of entrepreneurship to the American economy.
- 13.03 List the advantages and disadvantages of business ownership.
- 13.04 Identify the risks involved in ownership of a business.
- 13.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 13.06 Identify the business skills needed to operate a small business efficiently and effectively.

14.0 DEMONSTRATE KNOWLEDGE OF FLORIDA LAW AND STATE BOARD REQUIREMENTS--The student will be able to:

- 14.01 Demonstrate working knowledge of Florida Law, Chapter 477.
- 14.02 Demonstrate Universal HIV-AIDS Precaution Procedures for the salon and knowledge of appropriate behavior in dealing with persons who may have the virus or syndrome.
- 14.03 Demonstrate knowledge of the "Florida Right-to-Know" Law, Chapter 442.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Barge And Boat Operation
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	N/A
	PSAV
Program Numbers	**I490302**
CIP Number	0649.030200
Grade Level	30, 31
Length	450 Hours
Certification	SEAMANSHIP @7 G
Facility Code	246
VSO	VICA
Coop Method	Yes
Apprenticeship	No

I. **PURPOSE**: The purpose of this program is to prepare students for employment as a mate: ship, boat and barge (97505956) or to provide supplemental training for persons previously or currently employed in these occupations.

The plan of instruction prepares individuals for crew duties on fresh water and seagoing boats, barges and ships. Included are boat navigation, operation, maintenance, loading and unloading, and emergency procedures.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Barge and Boat Operation industry: planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II **LABORATORY ACTIVITIES**: Laboratory and onboard activities are an integral part of this program and provide instruction in the safe and efficient operation of commercial watercraft and related systems. Emphasis is placed on vessel operation. Vehicle towing duties may be taught as a local option.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction is appropriate for this program. Whenever the cooperative method is offered, the following is required for each student: a training agreement, a training plan signed by the student, teacher and employer, including instructional objectives and a list of on-the-job and in-school learning experiences and a work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must be paid for work performed.

When a student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards which the student must master to earn credit must be specified in the student's Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 9.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

When this program is offered at the postsecondary level it may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 450 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A

MATE: SHIP, BOAT, AND BARGE - OES Code 97505956

01.0 Dock a vessel.
02.0 Undock and get vessel underway.
03.0 Operate vessel at sea.
04.0 Maneuver around offshore structures.
05.0 Anchor vessel.
06.0 Manage and perform cargo handling duties.
07.0 Bring vessel into port.
08.0 Perform crew operational and maintenance duties aboard vessel in port.
09.0 Prepare meals aboard vessel.
10.0 Plan and perform emergency procedures.

11.0 Demonstrate appropriate communication skills.
12.0 Demonstrate appropriate math skills.
13.0 Demonstrate appropriate understanding of basic science.
14.0 Demonstrate employability skills.
15.0 Demonstrate an understanding of entrepreneurship.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Barge And Boat Operation
Secondary Number:
Postsecondary Number: I490302

OCCUPATIONAL COMPLETION POINT - DATA CODE A
MATE: SHIP, BOAT, AND BARGE - OES Code 97505956

01.0 DOCK A VESSEL--The student will be able to:

- 01.01 Assign crew members' positions for mooring vessel.
- 01.02 Cast off vessel's mooring lines while remaining on dock.
- 01.03 Cast off vessel's mooring lines while remaining aboard vessel.
- 01.04 Maneuver vessel to dock.
- 01.05 Release towing gear aboard towing vessel and barges.
- 01.06 Secure mooring lines to dock.
- 01.07 Secure mooring lines to vessel.
- 01.08 Secure engine room.
- 01.09 Secure a propeller shaft.

02.0 UNDOCK AND GET VESSEL UNDERWAY--The student will be able to:

- 02.01 Bleed air compressor of water.
- 02.02 Check and maintain batteries.
- 02.03 Measure fuel in day tank.
- 02.04 Maintain proper level of coolant in expansion tank.
- 02.05 Determine if all navigation lights are functioning.
- 02.06 Tighten engine mounts.
- 02.07 Inspect water level indicators for cleanliness.
- 02.08 Test marine radio equipment.
- 02.09 Inspect antenna for physical damage.
- 02.10 Determine if hydraulic steering equipment is free of air and water.
- 02.11 Inspect fire-fighting equipment for excessive wear, proper location, and prescribed type.
- 02.12 Inspect buoyant apparatus for excessive wear, proper location, and prescribed type.
- 02.13 Determine that rudder stuffing box is functioning properly.
- 02.14 Tighten propeller stuffing box.
- 02.15 Inspect vessel for fuel leakage.
- 02.16 Prepare list of equipment to be checked for oil leakage.
- 02.17 Determine if proper voltage is being generated.
- 02.18 Maneuver vessel from berth into navigable waterway.
- 02.19 Pump out bilges.
- 02.20 Secure loose deck equipment.
- 02.21 Secure watertight doors, hatches, vents, and skylights.

03.0 OPERATE VESSEL AT SEA--The student will be able to:

- 03.01 Act as vessel's lookout.

03.02 Determine if electrical connections and outlets are tight and dry.
03.03 Determine if electrical outlets have proper voltage.
03.04 Change air filters on engines.
03.05 Change oil in engines.
03.06 Change oil and fuel filters on engines.
03.07 Chip and paint vessel.
03.08 Clean engine room and its equipment.
03.09 Determine time of arrival when current effect is known.
03.10 Determine time of arrival when current effect is unknown.
03.11 Display day or night signals for different towing situations.
03.12 Inspect heaving lines, mooring lines, and fixed and running rigging for excessive wear.
03.13 Determine Greenwich Mean Time (GMT) by using vessel's chronometer.
03.14 Determine position by using omega navigation system.
03.15 Steer a course by using the magnetic compass.
03.16 Determine "distance off" by using angular measurements.
03.17 Establish a vessel's dead reckoning (DR) track.
03.18 Determine position by means of celestial navigation.
03.19 Plot position by using loran and loran overprint charts.
03.20 Set sea watches.

04.0 MANEUVER AROUND OFFSHORE STRUCTURES--The student will be able to:

04.01 Assist personnel in boarding personnel basket.
04.02 Maneuver vessel to discharge passengers.
04.03 Maneuver vessel to discharge cargo.
04.04 Secure hoses on board vessel.
04.05 Secure lashings, hawsers, or mooring lines on board vessel.

05.0 ANCHOR VESSEL--The student will be able to:

05.01 Anchor vessel.
05.02 Maneuver vessel to anchorage area.
05.03 Anchor vessel by using anchor winch.
05.04 Anchor vessel by using anchor windlass.
05.05 Stack (tier) anchor chain in chain locker.

06.0 MANAGE AND PERFORM CARGO HANDLING DUTIES--The student will be able to:

06.01 Adjust vessel's mooring lines to allow for variations of tide and current.
06.02 Determine if all cargo is aboard.
06.03 Determine if all deck cargo is secured.
06.04 Determine if vessel is loaded in compliance with stability laws.
06.05 Discharge cargo by using bulk cargo system.
06.06 Load cargo by using bulk cargo system.
06.07 Prepare list of lost or damaged cargo.

07.0 BRING VESSEL INTO PORT--The student will be able to:

07.01 Determine approximate position and hazardous bottom conditions by using pathometer.
07.02 Determine position by using radio direction finder (RDF).
07.03 Inspect engine room equipment for proper maintenance and safety.
07.04 Determine vessel's course and position against dead reconing plots.
07.05 Correct nautical chart prior to departure.
07.06 Prepare vessel to take on fuel and lube oil.
07.07 Prepare to take on water aboard vessel.

08.0 PERFORM CREW OPERATIONAL AND MAINTENANCE DUTIES ABOARD VESSEL IN PORT--The student will be able to:

08.01 Arrange for dry docking vessel.
08.02 Change brushes in auxiliary engines.
08.03 Change lube oil filters on auxiliary engines.
08.04 Change fuel filters on auxiliary engines.
08.05 Determine if motor bearings are excessively warn.
08.06 Clean electric motor.
08.07 Prepare list of hoses, valves, connections, gaskets, and tanks needing repairs.
08.08 Determine if const-a-voltage regulator is functioning properly.
08.09 Determine if drive belts on air compressors are excessively loose.
08.10 Tighten panel box fittings to prevent vibration.
08.11 Clean keel cool strainers.
08.12 Clean oil coolers.
08.13 Clean oil strainers in marine gears.
08.14 Drain water out of fuel traps.
08.15 Tighten fuel and oil line connections on engines.
08.16 Inspect day tanks containing fuel for leaks.
08.17 Lubricate deck and engine room equipment on a regular schedule.
08.18 Determine vessel's manning requirements.
08.19 Splice eye into line.
08.20 Wash down vessel's superstructure and decks.

09.0 PREPARE MEALS ABOARD VESSEL--The student will be able to:

09.01 Make yeast breads, biscuits, and cornbread.
09.02 Make pie crust.
09.03 Make cream filling for pie.
09.04 Make pancakes.
09.05 Make cakes.
09.06 Cook vegetables by boiling, simmering, and steaming.
09.07 Cook meat, fish, and fowl by broiling.
09.08 Cook meat, seafood, and fowl by braising.
09.09 Cook meat, fish, and fowl by roasting or baking.
09.10 Season and bread meat, seafood, and fowl for baking, roasting, broiling, and frying.
09.11 Cook eggs by frying and scrambling.
09.12 Make gravies.
09.13 Make coffee.
09.14 Make salads.

09.15 Prepare soup stock.
09.16 Prepare sandwiches.
09.17 Prepare dehydrated or concentrated foods.
09.18 Make soup with stock, meats, vegetables, and seasonings, as required by recipe.
09.19 Carve cooled meat.
09.20 Cut trim, and bone beef, lamb, pork, or fish into prescribed portions for steaks, chops, and fillets.
09.21 Clean and care for equipment.
09.22 Order food.
09.23 Plan menus.
09.24 Keep records for purchasing foods.
09.25 Store food.
09.26 Keep continuous inventory of food items.

10.0 PLAN AND PERFORM EMERGENCY PROCEDURES--The student will be able to:

10.01 Act as lookout to keep person in sight who has been lost overboard.
10.02 Administer first aid to prevent shock.
10.03 Administer first aid to control bleeding.
10.04 Administer CPR.
10.05 Launch lifeboat and life raft.
10.06 Close emergency fuel shutoff valves.
10.07 Extinguish class C fire.
10.08 Maneuver life raft or lifeboat away from vessel.
10.09 Maneuver vessel to return to area in which person was lost overboard.
10.10 Issue life preservers for use by passengers and crew.
10.11 Secure engine room to prevent spread of fire.
10.12 Send out distress signals.
10.13 Sound abandon - ship alarm.
10.14 Train crew to perform emergency procedures.

11.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

11.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
11.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
11.03 Read and follow written and oral instructions.
11.04 Answer and ask questions coherently and concisely.
11.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
11.06 Demonstrate appropriate telephone/communication skills.

12.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

12.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

12.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
12.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
12.05 Demonstrate an understanding of federal, state and local taxes and their computation.

13.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

13.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
13.02 Draw conclusions or make inferences from data.
13.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
13.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

14.01 Conduct a job search.
14.02 Secure information about a job.
14.03 Identify documents which may be required when applying for a job interview.
14.04 Complete a job application form correctly.
14.05 Demonstrate competence in job interview techniques.
14.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
14.07 Identify acceptable work habits.
14.08 Demonstrate knowledge of how to make job changes appropriately.
14.09 Demonstrate acceptable employee health habits.
14.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

15.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

15.01 Define entrepreneurship.
15.02 Describe the importance of entrepreneurship to the American economy.
15.03 List the advantages and disadvantages of business ownership.
15.04 Identify the risks involved in ownership of a business.
15.05 Identify the necessary personal characteristics of a successful entrepreneur.
15.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Biomedical Equipment Engineering Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.040101
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT:** This program is designed to prepare students for employment as electromedical and biomedical equipment technicians (DOT 019.261-010), biomedical equipment engineering technicians, or in related occupations in electronics. This program also provides supplemental training to persons previously or currently employed in these occupations.

Electronic Technology and/or Electronic Engineering Technology (CORE) are prerequisites for entry into this electronic specialization program. The CORE program prepares individuals to assemble, install, operate, maintain, troubleshoot and repair electronic equipment used in industry. In addition, it also includes content related to the design, theory, and analysis of electronic systems and applications.

This specialization content includes, but is not limited to, repair of hydraulic and pneumatic systems, optical systems, treatment and diagnostic devices, monitoring equipment, electrosurgical generators and operation of testers and analyzers.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Biomedical Equipment Engineering industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Electronic laboratory activities are an integral part of this program. The tools, test equipment, materials and processes used in this laboratory are similar to those used in industry. Students should be able to use the various types of precision test equipment found in general use throughout the electronics industry for the purpose of analyzing, troubleshooting and repairing electronic circuitry.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

This general education requirement must have a minimum of 15 semester hours with at least one course in oral and written communication and one course in computational skills. The computational skills should include algebra and trigonometry.
The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; and a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in troubleshooting and repairing mechanical systems.
02.0 Troubleshoot, service, align and repair feedback systems.
03.0 Troubleshoot, service and repair hydraulic and pneumatic systems.
04.0 Troubleshoot, service and repair optical systems.
05.0 Troubleshoot, service and repair treatment devices.
06.0 Troubleshoot, service and repair diagnostic devices.
07.0 Troubleshoot, service and repair monitoring devices.
08.0 Operate testers and analyzers.
09.0 Demonstrate an understanding of the theory of biomedical hydraulic and pneumatic systems.
10.0 Demonstrate an understanding of theory of optical systems for biomedical applications.
11.0 Demonstrate an understanding of theory of biomedical monitoring equipment.
12.0 Demonstrate an understanding of theory of electrosurgical generators and equipment.
13.0 Demonstrate an understanding of theory and application of diagnostic equipment.
14.0 Recognize and respond to electrical device hazards.
15.0 Demonstrate appropriate communication skills.
16.0 Demonstrate appropriate math skills.
17.0 Demonstrate appropriate understanding of basic science.
18.0 Demonstrate employability skills.
19.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Biomedical Equipment Engineering Technology
Secondary Number:
Postsecondary Number: 0615.040101

01.0 DEMONSTRATE PROFICIENCY IN TROUBLESHOOTING AND REPAIRING MECHANICAL SYSTEMS--The student will be able to:

01.01 Analyze power transmission components (gears, belts, chains, couplings, clutches and screw systems).
01.02 Troubleshoot power transmission components.
01.03 Repair poor transmission components.
01.04 Align power transmission components.
01.05 Analyze bearings.
01.06 Troubleshoot bearings.
01.07 Repair bearings.
01.08 Apply lubrications specifications to mechanical systems.
01.09 Analyze linkages and levers.
01.10 Troubleshoot linkages and levers.
01.11 Repair linkages and levers.
01.12 Align linkages and levers.
01.13 Analyze cams.
01.14 Troubleshoot cams.
01.15 Repair cams.
01.16 Align cams.
01.17 Analyze materials to statics and material specifications.
01.18 Troubleshoot materials to statics and materials specifications.
01.19 Repair materials to statics and material specifications.
01.20 Analyze metals to heat treating specifications.
01.21 Troubleshoot metals to heat treating specifications.
01.22 Repair metals to heat treating specifications.

02.0 TROUBLESHOOT, SERVICE, ALIGN AND REPAIR FEEDBACK SYSTEMS--The student will be able to:

02.01 Analyze transducers.
02.02 Troubleshoot transducers.
02.03 Align transducers.
02.04 Analyze motor controls.
02.05 Troubleshoot motor controls.
02.06 Repair motor controls.
02.07 Align motor controls.
02.08 Analyze synchros and resolvers.
02.09 Troubleshoot synchros and resolvers.
02.10 Align synchros and resolvers.
02.11 Analyze pulse encoders.
02.12 Troubleshoot pulse encoders.
02.13 Align pulse encoders.
02.14 Analyze farrand scales.
02.15 Troubleshoot farrand scales.
02.16 Align farrand scales.

03.0 TROUBLESHOOT, SERVICE AND REPAIR HYDRAULIC AND PNEUMATIC SYSTEMS--The student will be able to:

03.01 Clean components and systems.
03.02 Analyze pumps (positive and negative).
03.03 Troubleshoot pumps (positive and negative pressures).
03.04 Align pumps (positive and negative pressures).
03.05 Analyze control and metering devices.
03.06 Troubleshoot control and metering devices.
03.07 Repair control and metering devices.
03.08 Analyze electromechanical valves (directional and control).
03.09 Troubleshoot electromechanical valves (directional and control).
03.10 Repair electromechanical valves (directional and control).
03.11 Analyze valve actuators (solenoid, servo, flow-control).
03.12 Troubleshoot (solenoid, servo, flow-control).
03.13 Repair (solencid, servo, flow-control).
03.14 Analyze linear and rotary actuators.
03.15 Troubleshoot linear and rotary actuators.
03.16 Repair linear and rotary actuators.
03.17 Analyze pressure and flow regulators.
03.18 Troubleshoot pressure and flow regulators.
03.19 Repair pressure and flow regulators.
03.20 Analyze hydraulic and pneumatic circuits and systems.
03.21 Troubleshoot hydraulic and pneumatic circuits and systems.
03.22 Repair hydraulic and pneumatic circuits and systems.
03.23 Analyze piping reservoirs and fittings.
03.24 Troubleshoot piping reservoirs and fittings.
03.25 Repair piping reservoirs and fittings.

04.0 TROUBLESHOOT, SERVICE AND REPAIR OPTICAL SYSTEMS--The student will be able to:

04.01 Analyze optics systems.
04.02 Troubleshoot optics systems.
04.03 Repair optics systems.
04.04 Analyze laser detectors.
04.05 Troubleshoot laser detectors.
04.06 Repair laser detectors.
04.07 Set up and operate laser alignment equipment.
04.08 Set up and operate laser interferometers.

05.0 TROUBLESHOOT, SERVICE AND REPAIR TREATMENT DEVICES--The student will be able to:

05.01 Determine operational status of surgical lasers.
05.02 Troubleshoot surgical lasers.
05.03 Remove and replace surgical laser components.
05.04 Perform operating systems check and make minor adjustment of surgical lasers.
05.05 Determine operational status of dialysis machines.
05.06 Troubleshoot dialysis machines.
05.07 Remove and replace dialysis machines components.

05.08 Perform operating systems check and make minor adjustments of dialysis machines.
05.09 Determine operational status of diathermy machines.
05.10 Troubleshoot diathermy machines.
05.11 Remove and replace diathermy machine components.
05.12 Perform operating systems check and make minor adjustments of diathermy machines.
05.13 Determine operational status of anesthesiologist devices.
05.14 Troubleshoot anesthesiologist devices.
05.15 Remove and replace anesthesiologist devices components.
05.16 Perform operating systems check and make minor adjustments of anesthesiologist devices.
05.17 Determine operational status of infusion control devices.
05.18 Troubleshoot infusion control devices.
05.19 Remove and replace infusion control devices components.
05.20 Perform operational systems check and make minor adjustments of infusion control devices.
05.21 Determine operational status of pacemaker support equipment.
05.22 Troubleshoot pacemaker support equipment.
05.23 Remove and replace pacemaker support equipment components.
05.24 Perform operating systems check and make minor adjustments of pacemaker support equipment.
05.25 Determine operational status of respiration therapy devices.
05.26 Troubleshoot respiration therapy devices.
05.27 Remove and replace respiration therapy device components.
05.28 Perform operating systems check and make minor adjustments of respiratory therapy devices.
05.29 Determine operational status of surgical microscopes.
05.30 Troubleshoot surgical microscopes.
05.31 Remove and replace surgical microscope components.
05.32 Perform operating systems check and make minor adjustments of surgical microscopes.
05.33 Determine operational status of sterilizers (gas and EtO).
05.34 Troubleshoot sterilizer (gas and EtO) devices.
05.35 Remove and replace sterilizer (gas and EtO) components.
05.36 Perform operating systems check and make minor adjustments of gas and EtO sterilizers.
05.37 Determine operating status of defibrillators.
05.38 Remove and replace defibrillator components.
05.39 Perform operating systems check and make minor adjustments of defibrillator devices.
05.40 Determine operational status of electrosurgical devices.
05.41 Troubleshoot electrosurgical devices.
05.42 Remove and replace electrosurgical device components.
05.43 Perform operation systems check and make minor adjustments of electrosurgical devices.
05.44 Determine operational status of portable X-ray machines (single).
05.45 Troubleshoot portable X-ray machines (simple).
05.46 Remove and replace portable X-ray (simple) components.
05.47 Perform operation systems check and make minor adjustments of portable X-ray machines (simple).
05.48 Determine operational status of electrical bed stations.
05.49 Troubleshoot electrical bed stations.

05.50 Remove and replace electrical bed station components.
05.51 Perform operating systems check and make minor adjustments of electrical bed station.
05.52 Determine operational status of hyperthermia and hypothermia devices.
05.53 Troubleshoot hyperthermia and hypothermia devices.
05.54 Remove and replace hyperthermia and hypothermia devices components.
05.55 Perform operation systems check and make minor adjustment of hyper/hypothermia devices.
05.56 Determine operational status of radiant warmers.
05.57 Troubleshoot radiant warmers.
05.58 Remove and replace radiant warmer components.
05.59 Perform operating systems check and make minor adjustments of hyper-hypothermia devices.
05.60 Determine operational status of incubators.
05.61 Troubleshoot incubators.
05.62 Remove and replace incubator components.
05.63 Perform operating systems check and make minor adjustments of incubators.
05.64 Determine operational status of fetal monitors.
05.65 Troubleshoot fetal monitors.
05.66 Remove and replace fetal monitor components.
05.67 Perform operating systems check and make minor adjustments of fetal monitors.
05.68 Determine operational status of chun guns.
05.69 Troubleshoot chun guns.
05.70 Remove and replace chun gun components.
05.71 Perform operating systems check and make minor adjustments of chun guns.

06.0 TROUBLESHOOT, SERVICE AND REPAIR DIAGNOSTIC DEVICES--The student will be able to:

06.01 Determine the operating status of blood cell counters.
06.02 Troubleshoot blood cell counters.
06.03 Remove and replace blood cell counter components.
06.04 Perform operating systems check and make minor adjustments of blood cell counters.
06.05 Determine the operating status of centrifuge devices.
06.06 Troubleshoot centrifuge devices.
06.07 Remove and replace centrifuge device components.
06.08 Perform operating systems check and make minor adjustments of centrifuge devices.
06.09 Determine the operating status of nephelometry devices.
06.10 Troubleshoot nephelometry devices.
06.11 Remove and replace nephelometry device components.
06.12 Perform operating systems check and make minor adjustments of nephelometry devices.
06.13 Determine the operational status of automated chemistry analyzers.
06.14 Troubleshoot automated chemistry analyzers.
06.15 Remove and replace automated chemistry analyzer components.

06.16 Perform operation systems check and make minor adjustments of automated chemistry analyzers.
06.17 Determine the operational status of simple scintillation counters.
06.18 Troubleshoot simple scintillation counters.
06.19 Remove and replace scintillation counter components.
06.20 Perform operation systems check and make minor adjustments of simple scintillation counters.
06.21 Determine the operations status of audiometers.
06.22 Troubleshoot audiometers.
06.23 Remove and replace audiometer components.
06.24 Perform operation systems check and make minor adjustments of audiometers.
06.25 Determine the operational status of electrophoresis equipment.
06.26 Troubleshoot electrophoresis equipment.
06.27 Remove and replace electrophoresis equipment components.
06.28 Perform operating systems check and make minor adjustments of electrophoresis equipment.
06.29 Determine the operational status of blood gas analyzers.
06.30 Troubleshoot blood gas analyzers.
06.31 Remove and replace blood gas analyzer component.
06.32 Perform operating systems check and make minor adjustments of blood gas analyzers.
06.33 Determine the operational status of HPLC and gas chromatograph equipment.
06.34 Troubleshoot HPLC and gas chromatograph equipment.
06.35 Remove and replace HPLC and gas chromatograph equipment components.
06.36 Perform operating systems check and make minor adjustments of HPLC and gas chromatograph equipment.
06.37 Determine the operational status of refractometers.
06.38 Troubleshoot simple refractometers.
06.39 Remove and replace simple refractometers.
06.40 Perform operating systems check and make minor adjustments of refractometers.
06.41 Determine the operational status of spectrophotometers.
06.42 Troubleshoot spectrophotometers.
06.43 Remove and replace spectrophotometer components.
06.44 Perform operating systems check and make minor adjustments of spectrophotometers.
06.45 Determine the operational status of laboratory microscopes.
06.46 Troubleshoot laboratory microscopes.
06.47 Remove and replace laboratory microscope components.
06.48 Perform operating systems check and make minor adjustments of laboratory microscopes.
06.49 Determine operational status of EEG devices.
06.50 Troubleshoot EEG devices.
06.51 Remove and replace EEG device components.
06.52 Perform operating systems check and make minor adjustments of EEG devices.
06.53 Determine operational status of EMG devices.
06.54 Troubleshoot EMG devices.
06.55 Remove and replace EMG device components.

06.56 Perform operation systems check and make minor adjustments of EMG devices.
06.57 Determine operational status of ENG devices.
06.58 Troubleshoot ENG devices.
06.59 Remove and replace ENG device components.
06.60 Perform operating systems check and make minor adjustments of ENG devices.
06.61 Determine operational status of transcutaneous devices.
06.62 Troubleshoot transcutaneous devices.
06.63 Remove and replace transcutaneous device components.
06.64 Perform operating systems check and make minor adjustments of transcutaneous devices.

07.0 TROUBLESHOOT, SERVICE AND REPAIR MONITORING DEVICES--The student will be able to:

07.01 Determine the operational status of EKG devices.
07.02 Troubleshoot EKG devices.
07.03 Remove and replace EKG device and components.
07.04 Perform operating systems check and make minor adjustment of EKG devices.
07.05 Determine the operational status of pressure devices.
07.06 Troubleshoot pressure devices.
07.07 Remove and replace pressure device components.
07.08 Perform operating systems check and make minor adjustments of pressure devices.
07.09 Determine the operation status of temperature devices.
07.10 Troubleshoot temperature devices.
07.11 Remove and replace temperature device components.
07.12 Perform operating systems check and make minor adjustments of temperature devices.
07.13 Determine the operational status of respiration devices.
07.14 Troubleshoot respiration devices.
07.15 Remove and replace respiration device components.
07.16 Perform operating systems check and make minor adjustments of respiration devices.
07.17 Determine the operational status of fluid output devices.
07.18 Troubleshoot fluid output devices.
07.19 Remove and replace fluid output device components.
07.20 Perform operating systems check and make minor adjustments of fluid output devices.
07.21 Determine the operational status of holter monitors.
07.22 Troubleshoot holter monitors.
07.23 Remove and replace holter monitors device components.
07.24 Perform operating systems check and make minor adjustments of holter monitors.
07.25 Determine the operational status of telemetry systems.
07.26 Troubleshoot telemetry systems.
07.27 Remove and replace telemetry system components.
07.28 Perform operating systems check and make minor adjustments of telemetry systems.
07.29 Determine the operational status of doppler blood flow devices.
07.30 Troubleshoot doppler blood flow devices.
07.31 Remove and replace doppler blood flow device components.

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07.32 Perform operating systems check and make minor adjustments of doppler blood flow devices.
07.33 Determine the operational status of in vivo pressure transducers.
07.34 Troubleshoot in vivo pressure transducers.
07.35 Remove and replace in vivo pressure transducer components.
07.36 Perform operating systems check and make minor adjustments of in vivo pressure transducers.
07.37 Determine the operational status of chart recorders.
07.38 Troubleshoot chart recorders.
07.39 Remove and replace chart recorder components.
07.40 Perform operating systems check and make minor adjustments.

08.0 OPERATE TESTERS AND ANALYZERS--The student will be able to:

08.01 Operate safety analyzer.
08.02 Operate defibrillator tester.
08.03 Operate electrosurgical analyzer.
08.04 Operate EKG simulator.
08.05 Operate pressure simulator.
08.06 Operate temperature simulator.

09.0 DEMONSTRATE AN UNDERSTANDING OF THE THEORY OF BIOMEDICAL HYDRAULIC AND PNEUMATIC SYSTEMS--The student will be able to:

09.01 Analyze a hydraulic pump.
09.02 Troubleshoot a hydraulic pump.
09.03 Align a hydraulic pump.
09.04 Analyze repair metering devices.
09.05 Troubleshoot repair metering devices.
09.06 Align repair metering devices.
09.07 Analyze electromechanical valves and valve actuators.
09.08 Troubleshoot electromechanical valves and valve actuators.
09.09 Align and operate an electromechanical valve and valve actuator.
09.10 Analyze pressure and flow regulators.
09.11 Troubleshoot electromechanical valves and valve actuators.
09.12 Align and operate a pressure and flow regulator.
09.13 Design and layout hydraulic and pneumatic series and system.

10.0 DEMONSTRATE AN UNDERSTANDING OF THEORY OF OPTICAL SYSTEMS FOR BIOMEDICAL APPLICATIONS--The student will be able to:

10.01 Analyze an optical system for a biomedical application.
10.02 Troubleshoot an optical system for a biomedical application.
10.03 Repair and operate an optical system for a premedical application.
10.04 Analyze a laser system for a biomedical application.
10.05 Troubleshoot a laser system for a biomedical application.
10.06 Repair and operate a laser system for a biomedical application.
10.07 Describe an optical system as it applies to the biomedical field.
10.08 Describe a laser system as it applies to the biomedical field.

11.0 DEMONSTRATE AN UNDERSTANDING OF THEORY OF BIOMEDICAL MONITORING EQUIPMENT--The student will be able to:

- 11.01 Demonstrate an understanding of the theory of audio cardiac monitoring equipment.
- 11.02 Demonstrate an understanding of the theory of visual cardiac monitoring equipment.
- 11.03 Demonstrate an understanding of the theory of mechanical cardiac monitoring and recording equipment.
- 11.04 Demonstrate an understanding of the theory of visual and mechanical blood pressure monitoring equipment.
- 11.05 Demonstrate an understanding of the theory of fetal monitoring equipment.
- 11.06 Demonstrate an understanding of the theory for instrumentation used in monitoring brain activity.

12.0 DEMONSTRATE AN UNDERSTANDING OF THEORY OF ELECTROSURGICAL GENERATORS AND EQUIPMENT--The student will be able to:

- 12.01 Demonstrate an understanding of theory of electrosurgical generators and equipment.
- 12.02 Demonstrate an understanding of theory of electrosurgical cutting,cauterizing and coagulating scalpels and associated equipment.

13.0 DEMONSTRATE AN UNDERSTANDING OF THEORY AND APPLICATION OF DIAGNOSTIC EQUIPMENT--The student will be able to:

- 13.01 Demonstrate an understanding of the theory of X-ray equipment.
- 13.02 Demonstrate an understanding of the theory of ultrasound equipment.
- 13.03 Demonstrate an understanding of the theory of magnetic resonance equipment.
- 13.04 Demonstrate an understanding of theory of computerized axial tomographical equipment.

14.0 RECOGNIZE AND RESPOND TO ELECTRICAL DEVICE HAZARDS--The student will be able to:

- 14.01 Define electrical safety.
- 14.02 Describe physiological effects of macro and micro shock on the human body.
- 14.03 Describe hazards of micro shock.
- 14.04 Describe design considerations for reducing electrical hazards in medical environment.
- 14.05 Perform safety checks on electrical devices.
- 14.06 Maintain leakage records on electrical devices.
- 14.07 Recognize and correctly respond to radiation hazards.
- 14.08 Perform safety checks on radiation.
- 14.09 Recognize and correctly respond to biological hazards.
- 14.10 Recognize and correctly respond to chemical hazards.
- 14.11 Recognize and correctly respond to mechanical hazards.
- 14.12 Perform safety checks on mechanical devices.
- 14.13 Recognize and correctly respond to fluidic device hazards.

15.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 15.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 15.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 15.03 Read and follow written and oral instructions.
- 15.04 Answer and ask questions coherently and concisely.
- 15.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 15.06 Demonstrate appropriate telephone/communication skills.

16.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 16.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 16.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 16.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 16.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 16.05 Demonstrate an understanding of federal, state and local taxes and their computation.

17.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 17.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 17.02 Draw conclusions or make inferences from data.
- 17.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 17.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 18.01 Conduct a job search.
- 18.02 Secure information about a job.
- 18.03 Identify documents which may be required when applying for a job interview.
- 18.04 Complete a job application form correctly.
- 18.05 Demonstrate competence in job interview techniques.
- 18.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
- 18.07 Identify acceptable work habits.
- 18.08 Demonstrate knowledge of how to make appropriate job changes.
- 18.09 Demonstrate acceptable employee health habits.

18.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

19.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

19.01 Identify characteristics of the American enterprise system.
19.02 Define inflation and deflation.
19.03 Illustrate the basic economic questions facing any society.
19.04 Determine the results of a change in demand or a change in supply.
19.05 List factors which contribute to economic growth.
19.06 Identify characteristics of different types of business ownership.
19.07 Choose appropriate action in a situation requiring application of business ethics.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Biomedical Equipment Technology
Occupational Area:	Industrial Industrial
	PSAV
Program Numbers	**I150401**
CIP Number	0615.040100
Grade Level	30, 31
Length	600 hours
Certification	TEC MED @7 G
	BIOMED EQ @7 G
	PRAC NURSE ¶@7 ¶G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as electromedical and biomedical repairer, (OES 85908652). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content includes, but is not limited to, hydraulics, pneumatics, optics and mechanics to troubleshoot, service and repair equipment commonly used for treatment, diagnosis and monitoring of patients in a medical environment.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Biomedical Equipment industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry, electronic, hydraulic, pneumatic and optical systems commonly found in treatment, diagnostic and monitoring devices.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan signed by the student, teacher and employer which includes instructional objectives and a list of on-the-

job and in-school learning experiences; and a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

Electronic Technology and/or Electronic Engineering Technology are prerequisites for entry into this electronic specialization. Algebra is recommended as a prerequisite for entry into this program.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 10.0, Language 9.0, Reading 10.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Rule 6A-10.040, FAC.

The typical length of this program for the average achieving student is 600 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in mechanics/micromechanics.
02.0 Demonstrate proficiency in sensor and feedback devices.
03.0 Demonstrate proficiency in hydraulic vacuum systems.
04.0 Demonstrate proficiency in repairing optical systems.
05.0 Demonstrate proficiency in repairing treatment devices.
06.0 Demonstrate proficiency in repairing diagnostic devices.
07.0 Demonstrate proficiency in repairing monitoring devices.
08.0 Operate testers and analyzers.
09.0 Demonstrate knowledge of biomedical equipment hazards.
10.0 Demonstrate appropriate communication skills.
11.0 Demonstrate appropriate math skills.
12.0 Demonstrate appropriate understanding of basic science.
13.0 Demonstrate employability skills.
14.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Biomedical Equipment Technology
Secondary Number:
Postsecondary Number: I150401

01.0 DEMONSTRATE PROFICIENCY IN MECHANICS/MICROMECHANICS--The student will be able to:

- 01.01 Analyze, troubleshoot, repair and align power transmission components (gears, belts, chains, couplings, clutches and screw systems).
- 01.02 Analyze, troubleshoot, and repair bearings.
- 01.03 Apply lubrication specifications to mechanical systems.
- 01.04 Analyze, troubleshoot, repair, and align linkages and hoses.
- 01.05 Analyze, troubleshoot, repair, and align cams.
- 01.06 Analyze and troubleshoot materials to statics and material specifications.
- 01.07 Analyze, troubleshoot, and repair metals to heat treating specifications.
- 01.08 Clean components and systems.

02.0 DEMONSTRATE PROFICIENCY IN SENSOR AND FEEDBACK DEVICES--The student will be able to:

- 02.01 Analyze, troubleshoot and align transducers.
- 02.02 Analyze, troubleshoot, repair, and align motor controls.
- 02.03 Analyze, troubleshoot and align synchros and resolvers.
- 02.04 Analyze, troubleshoot and align pulse encoders.
- 02.05 Analyze, troubleshoot and align farrand scales.

03.0 DEMONSTRATE PROFICIENCY IN HYDRAULIC VACUUM SYSTEMS--The student will be able to:

- 03.01 Clean components and systems.
- 03.02 Analyze, troubleshoot, and align pumps (positive and negative pressures).
- 03.03 Analyze, troubleshoot, and repair control and metering devices.
- 03.04 Analyze, troubleshoot, and repair electromechanical valves (directional and control).
- 03.05 Analyze, troubleshoot, and repair valve actuators (solenoid, servo, flow-control).
- 03.06 Analyze, troubleshoot, and repair linear and rotary actuators.
- 03.07 Analyze, troubleshoot, and repair pressure and flow regulators.
- 03.08 Analyze and troubleshoot hydraulic and pneumatic circuits and systems.
- 03.09 Analyze, troubleshoot, and repair piping reservoirs and fittings.

04.0 DEMONSTRATE PROFICIENCY IN REPAIRING OPTICAL SYSTEMS--The student will be able to:

04.01 Analyze, troubleshoot and repair optics systems.
04.02 Analyze, troubleshoot and repair laser detectors.
04.03 Set up and operate laser alignment equipment.
04.04 Set up and operate laser interferometers.

05.0 DEMONSTRATE PROFICIENCY IN REPAIRING TREATMENT DEVICES--The student will be able to:

05.01 Troubleshoot and repair surgical lasers.
05.02 Perform operating systems check and make minor adjustments of surgical lasers.
05.03 Troubleshoot and repair dialysis machines.
05.04 Perform operating systems check and make minor adjustments of dialysis machines.
05.05 Troubleshoot and repair diathermy machines.
05.06 Perform operating systems check and make minor adjustments of diathermy machines.
05.07 Troubleshoot and repair anesthesiologist devices.
05.08 Perform operational systems check and make minor adjustments of anesthesiologist devices.
05.09 Troubleshoot and repair infusion control devices.
05.10 Perform operating systems check and make minor adjustments of infusion control devices.
05.11 Troubleshoot and repair pacemaker support equipment.
05.12 Perform operating systems check and make minor adjustments of pacemaker support equipment.
05.13 Troubleshoot and repair respiration therapy devices.
05.14 Perform operating systems check and make minor adjustments of respiration therapy devices.
05.15 Troubleshoot and repair surgical microscopes.
05.16 Perform operating systems check and make minor adjustments of surgical microscopes.
05.17 Troubleshoot and repair sterilizer (gas & EtO) devices.
05.18 Perform operating systems check and make minor adjustments of gas and EtO sterilizers.
05.19 Troubleshoot and repair defibrillators.
05.20 Perform operating systems check and make minor adjustments of defibrillator devices.
05.21 Troubleshoot and repair electrosurgical devices.
05.22 Perform operating systems check and make minor adjustments of electrosurgical devices.
05.23 Troubleshoot and repair portable X-ray machines (simple).
05.24 Perform operating systems check and make minor adjustments of portable X-ray machines (simple).
05.25 Troubleshoot and repair electrical bed stations.
05.26 Perform operating systems check and make minor adjustments of electrical bed stations.
05.27 Troubleshoot and repair hyperthermia and hypothermia devices.
05.28 Perform operating systems check and make minor adjustments of hyper/hypothermia devices.
05.29 Troubleshoot and repair radiant warmers.
05.30 Perform operating systems check and make minor adjustments of radiant warmers.

05.31 Troubleshoot and repair incubators.
05.32 Perform operating systems check and make minor adjustments of incubators.
05.33 Troubleshoot and repair fetal monitors.
05.34 Perform operating systems check and make minor adjustments of fetal monitors.
05.35 Troubleshoot and repair chun guns.
05.36 Perform operating systems check and make minor adjustments of chun guns.

06.0 DEMONSTRATE PROFICIENCY IN REPAIRING DIAGNOSTIC DEVICES--The student will be able to:

06.01 Troubleshoot and repair blood cell counters.
06.02 Perform operating systems check and make minor adjustments of blood cell counters.
06.03 Troubleshoot and repair centrifuge devices.
06.04 Perform operating systems check and make minor adjustments of centrifuge devices.
06.05 Troubleshoot and repair nephelometry devices.
06.06 Perform operating systems check and make minor adjustments of nephelometry devices.
06.07 Troubleshoot and repair automated chemistry analyzers.
06.08 Perform operating systems check and make minor adjustments of automated chemistry analyzers.
06.09 Troubleshoot and repair simple scintillation counters.
06.10 Perform operating systems check and make minor adjustments of simple scintillation counters.
06.11 Troubleshoot and repair audiometers.
06.12 Perform operating systems check and make minor adjustments of audiometers.
06.13 Troubleshoot and repair electrophoresis equipment.
06.14 Perform operating systems check and make minor adjustments of electrophoresis equipment.
06.15 Troubleshoot and repair blood gas analyzers.
06.16 Perform operating systems check and make minor adjustments of blood gas analyzers.
06.17 Troubleshoot and repair HPLC and gas chromatograph equipment.
06.18 Perform operating systems check and make minor adjustments of HPLC and gas chromatograph equipment.
06.19 Troubleshoot and repair simple refractometers.
06.20 Perform operating systems check and make minor adjustments of refractometers.
06.21 Troubleshoot and repair spectrophotometers.
06.22 Perform operating systems check and make minor adjustments of spectrophotometer.
06.23 Troubleshoot and repair laboratory microscopes.
06.24 Perform operating systems check and make minor adjustments of laboratory microscopes.
06.25 Troubleshoot and repair EEG devices.
06.26 Perform operating systems check and make minor adjustments of EEG devices.
06.27 Troubleshoot and repair EMG devices.

06.28 Perform operating systems check and make minor adjustments of EMG devices.
06.29 Troubleshoot and repair ENG devices.
06.30 Perform operating systems check and make minor adjustments of ENG devices.
06.31 Troubleshoot and repair transcutaneous devices.
06.32 Perform operating systems check and make minor adjustments of transcutaneous devices.

07.0 DEMONSTRATE PROFICIENCY IN REPAIRING MONITORING DEVICES--The student will be able to:

07.01 Troubleshoot and repair EKG devices.
07.02 Perform operating systems check and make minor adjustments of EKG devices.
07.03 Troubleshoot and repair pressure devices.
07.04 Perform operating systems check and make minor adjustments of pressure devices.
07.05 Troubleshoot and repair temperature devices.
07.06 Perform operating systems check and make minor adjustments of temperature devices.
07.07 Troubleshoot and repair respiration devices.
07.08 Perform operating systems check and make minor adjustments of respiration devices.
07.09 Troubleshoot and repair fluid output devices.
07.10 Perform operating systems check and make minor adjustments of fluid output devices.
07.11 Troubleshoot and repair holter monitors.
07.12 Perform operating systems check and make minor adjustments of holter monitors.
07.13 Troubleshoot and repair telemetry systems.
07.14 Perform operating systems check and make minor adjustments of telemetry systems.
07.15 Troubleshoot and repair doppler blood flow devices.
07.16 Perform operating systems check and make minor adjustments of doppler blood flow devices.
07.17 Troubleshoot and repair in vivo pressure transducers.
07.18 Perform operating systems check and make minor adjustments of in vivo pressure transducers.
07.19 Troubleshoot and repair chart recorders.
07.20 Perform operating systems check and make minor adjustments of chart recorders.

08.0 OPERATE TESTERS AND ANALYZERS--The student will be able to:

08.01 Operate safety analyzer.
08.02 Operate defibrillator tester.
08.03 Operate electrosurgical analyzer.
08.04 Operate EKG simulator.
08.05 Operate pressure simulator.
08.06 Operate temperature simulator.

09.0 DEMONSTRATE KNOWLEDGE OF BIOMEDICAL EQUIPMENT HAZARDS--The student will be able to:

09.01 Perform safety checks on electrical devices.
09.02 Maintain leakage records on electrical devices.
09.03 Recognize and correctly respond to radiation hazards.
09.04 Perform safety checks on radiation devices.
09.05 Recognize and correctly respond to biological hazards.
09.06 Recognize and correctly respond to chemical hazards.
09.07 Recognize and correctly respond to mechanical hazards.
09.08 Perform safety checks on mechanical devices.
09.09 Recognize and correctly respond to fluidics device hazards.

10.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

10.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
10.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
10.03 Read and follow written and oral instructions.
10.04 Answer and ask questions coherently and concisely.
10.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
10.06 Demonstrate appropriate telephone/communication skills.

11.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

11.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
11.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
11.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
11.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
11.05 Demonstrate an understanding of federal, state and local taxes and their computation.

12.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

12.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
12.02 Draw conclusions or make inferences from data.
12.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
12.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

13.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

13.01 Conduct a job search.
13.02 Secure information about a job.

13.03 Identify documents which may be required when applying for a job interview.
13.04 Complete a job application form correctly.
13.05 Demonstrate competence in job interview techniques.
13.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
13.07 Identify acceptable work habits.
13.08 Demonstrate knowledge of how to make appropriate job changes.
13.09 Demonstrate acceptable employee health habits.
13.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

14.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

14.01 Identify characteristics of the American enterprise system.
14.02 Define inflation and deflation.
14.03 Illustrate the basic economic questions facing any society.
14.04 Determine the results of a change in demand or a change in supply.
14.05 List factors which contribute to economic growth.
14.06 Identify characteristics of different types of business ownership.
14.07 Choose appropriate action in a situation requiring application of business ethics.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Blueprint Reading and Estimation
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I469919**
CIP Number	0646.999901
Grade Level	30, 31
Length	150 hours
Certification	TEC CONSTR @7 G
	DRAFTING @7 G
	BLU PR
	RDG @7 G
	CARPENTRY @7 G
	BLDG CONST @7 G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as blueprint readers, or to provide supplemental training for persons previously or currently employed in these occupations.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Blueprint Reading and Estimation industry: planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Laboratory activities are offered on campus or as "in-plant" programs in business and on company premises.

III. **SPECIAL NOTE**: This program is only offered as a component of a specialized program.

The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

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The typical length of this program for the average achieving student is 150 hours.

IV. **INTENDED OUTCOMES**--After successfully completing this program, the student will be able to:

01.0 Maintain blueprints.
02.0 Prepare sketches.
03.0 Develop basic blueprint reading skills.
04.0 Interpret mechanical drawings.
05.0 Interpret architectural drawings.
06.0 Interpret structural drawings.
07.0 Interpret electronic drawings.
08.0 Interpret pneumatic/hydraulic drawings.
09.0 Interpret charts and graphs.
10.0 Interpret maps drawings.
11.0 Estimate materials and cost.
12.0 Identify codes and standards.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate appropriate math skills.
15.0 Demonstrate appropriate understanding of basic science.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Blueprint Reading And Estimation
Secondary Number:
Postsecondary Number: I469919

01.0 MAINTAIN BLUEPRINTS--The student will be able to:

- 01.01 Make a blueprint.
- 01.02 Maintain blueprints.

02.0 PREPARE SKETCHES--The student will be able to:

- 02.01 Use freehand techniques.
- 02.02 Prepare multi-view sketch drawings.
- 02.03 Prepare pictorial sketch drawings.

03.0 DEVELOP BASIC BLUEPRINT READING SKILLS--The student will be able to:

- 03.01 Apply math skills.
- 03.02 Read scales and measuring instruments.
- 03.03 Read and interpret multi-view drawings.
- 03.04 Read and interpret section views.
- 03.05 Read and interpret auxiliary views.
- 03.06 Read and interpret types of dimensions.
- 03.07 Read and interpret pictorial drawings.
- 03.08 Read and interpret supplementary information.

04.0 INTERPRET MECHANICAL DRAWINGS--The student will be able to:

- 04.01 Read and interpret removable fastener drawings.
- 04.02 Read and interpret welding drawings.
- 04.03 Read and interpret geometric tolerances.
- 04.04 Read and interpret cam drawings.
- 04.05 Read and interpret gear drawings.
- 04.06 Read and interpret assembly and sub-assembly drawings.
- 04.07 Read and interpret detail drawings.
- 04.08 Read and interpret surface developments.
- 04.09 Read and interpret bearing drawings.
- 04.10 Read and interpret spring drawings.
- 04.11 Read and interpret casting drawings.
- 04.12 Read and interpret forging drawings.
- 04.13 Read and interpret tool drawings.
- 04.14 Read and interpret stamping drawings.
- 04.15 Read and interpret numerical control drawings.
- 04.16 Read and interpret computer aided drawings.

05.0 INTERPRET ARCHITECTURAL DRAWINGS--The student will be able to:

- 05.01 Read and interpret plot plans.
- 05.02 Read and interpret foundation plan drawings.
- 05.03 Read and interpret floor plan drawings.

05.04 Read and interpret elevation drawings.
05.05 Read and interpret section views and details.
05.06 Read and interpret schedules.
05.07 Read and interpret stair details.
05.08 Read and interpret fireplace details.
05.09 Read and interpret truss drawings.
05.10 Read and interpret roof-framing plans.
05.11 Read and interpret electrical plans.
05.12 Read and interpret plumbing drawings.
05.13 Read and interpret heating/cooling plans.
05.14 Read and interpret landscape layout drawings.
05.15 Read and interpret specifications.

06.0 INTERPRET STRUCTURAL DRAWINGS--The student will be able to:

06.01 Read and interpret erection plans.
06.02 Read and interpret structural steel design drawings.
06.03 Read and interpret structural steel drawings.
06.04 Read and interpret concrete engineering drawings.
06.05 Read and interpret placing drawings.

07.0 INTERPRET ELECTRONIC DRAWINGS--The student will be able to:

07.01 Read and interpret schematic drawings.
07.02 Read and interpret printed circuit board drawings.
07.03 Read and interpret package drawings.
07.04 Read and interpret connection drawings.
07.05 Read and interpret interconnection drawings.
07.06 Read and interpret wiring lists.
07.07 Read and interpret cable drawings.
07.08 Read and interpret harness drawings.
07.09 Read and interpret component drawings.
07.10 Read and interpret logic diagrams.
07.11 Read and interpret block diagrams.

08.0 INTERPRET PNEUMATIC/HYDRAULIC DRAWINGS--The student will be able to:

08.01 Read and interpret pictorial diagrams.
08.02 Read and interpret cutaway diagrams.
08.03 Read and interpret graphical diagrams.
08.04 Read and interpret combination diagrams.

09.0 INTERPRET CHARTS AND GRAPHS--The student will be able to:

09.01 Read and interpret charts.
09.02 Read and interpret graphs.

10.0 INTERPRET MAP DRAWINGS--The student will be able to:

10.01 Read and interpret traverse drawings.
10.02 Read and interpret plat drawings.
10.03 Read and interpret street layout drawings.
10.04 Read and interpret map drawings.
10.05 Read and interpret topographic drawings.

11.0 ESTIMATE MATERIALS AND COSTS--The student will be able to:

- 11.01 Compile manufactured material take-offs.
- 11.02 Compile construction take-offs.
- 11.03 Compile mechanical equipment take-offs.
- 11.04 Compile electrical/electronic take-offs.
- 11.05 Compile labor costs.
- 11.06 Compile equipment costs.
- 11.07 Compile overhead costs.

12.0 IDENTIFY CODES AND STANDARDS--The student will be able to:

- 12.01 Identify construction codes and standards.
- 12.02 Identify mechanical standards.
- 12.03 Identify electronic standards.

13.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 13.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 13.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 13.03 Read and follow written and oral instructions.
- 13.04 Answer and ask questions coherently and concisely.
- 13.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 13.06 Demonstrate appropriate telephone/communication skills.

14.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 14.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 14.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 14.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 14.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 14.05 Demonstrate an understanding of federal, state and local taxes and their computation.

15.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 15.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 15.02 Draw conclusions or make inferences from data.
- 15.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

15.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Identify documents which may be required when applying for a job interview.
16.04 Complete a job application form correctly.
16.05 Demonstrate competence in job interview techniques.
16.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
16.07 Identify acceptable work habits.
16.08 Demonstrate knowledge of how to make job changes appropriately.
16.09 Demonstrate acceptable employee health habits.
16.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define entrepreneurship.
17.02 Describe the importance of entrepreneurship to the American economy.
17.03 List the advantages and disadvantages of business ownership.
17.04 Identify the risks involved in ownership of a business.
17.05 Identify the necessary personal characteristics of a successful entrepreneur.
17.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Boat and Yacht Repair/Refinishing Technology
Occupational Area: Industrial Education

	Secondary	Postsecondary
Program Numbers	**8751300**	**I490316**
CIP Number	0649.030601	0649.030601
Grade Level	9-12, 30, 31	30, 31
Length	6 credits	1320 hours
Certification	SEAMANSHIP @7 G CARPENTRY @7 G	SEAMANSHIP @7 G CARPENTRY @7 G
Basic Skills:		
Math		9
Language		9
Reading		9

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as boat repairers (DOT 807.361-014).

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices as marine painter/refinisher, marine carpenter, marine mechanical systems technician or marine welder/fabricator. A program may be structured to emphasize one of the course areas but does not have to cover all areas comprehensively.

8751310 - Boat and Yacht Repair/Refinishing 1
8751320 - Boat and Yacht Repair/Refinishing 2
8751330 - Boat and Yacht Repair/Refinishing 3
8751340 - Boat and Yacht Repair/Refinishing 4
8751350 - Boat and Yacht Repair/Refinishing 5
8751360 - Boat and Yacht Repair/Refinishing 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Boat and Yacht Repair industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program and provide instruction in manufacturing, fabrication, repair, painting and refinishing in a boatyard manufacturing or refurbishing environment.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction is appropriate for this program. Whenever the cooperative method is offered, the following is required for each student: a training agreement, a training plan signed by the student, teacher and employer, including instructional objectives and a list of on-the-job learning experiences and a work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must be paid for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade levels required for postsecondary adult vocational students to exit this program are listed at the program level. These grade level numbers correspond to a grade equivalent score obtained on one of the state designated basic skills examinations. If a student does not meet the basic skills level required for completion from the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) or remedial laboratory. Please reference the Rule for exemptions.

When a secondary student with a disability is enrolled in a vocational class with modifications to the program framework, the particular outcomes and student performance standards which the student must master to earn credit must be specified in the student's individual education plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in describing different types of marine manufacturing industries.
02.0 Demonstrate proficiency in describing the different types of marine trades and occupations.
03.0 Demonstrate proficiency in preparing surfaces and applying marine paint finishes.
04.0 Demonstrate proficiency in preparing surfaces and refinishing fiberglass.
05.0 Demonstrate proficiency in marine terminology.
06.0 Demonstrate proficiency in safety practices in marine occupations.
07.0 Demonstrate the ability to properly handle lines and related operations in securing a vessel.
08.0 Demonstrate proficiency in coordinating the manufacturing, repair and refinishing operations in the marine industry.
09.0 Demonstrate appropriate communication skills.

10.0 Demonstrate appropriate math skills.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate employability skills.
13.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Boat And Yacht Repair/Refinishing Technology
Secondary Number: 8751300
Postsecondary Number: I490316

01.0 DEMONSTRATE PROFICIENCY IN DESCRIBING DIFFERENT TYPES OF MARINE MANUFACTURING INDUSTRIES--The student will be able to:

- 01.01 Explain the process of manufacturing motor yachts.
- 01.02 Explain the process of manufacturing sail boats.
- 01.03 Explain the process of manufacturing small power boats.
- 01.04 Explain the process of manufacturing center console boats.
- 01.05 Explain the process of manufacturing of commercial work boats.

02.0 DEMONSTRATE PROFICIENCY IN DESCRIBING THE DIFFERENT TYPES OF MARINE TRADES AND OCCUPATIONS--The student will be able to:

- 02.01 Describe the occupational requirements of a boat finisher/painter.
- 02.02 Describe the occupational requirements of a marine carpenter.
- 02.03 Describe the occupational requirements of a marine mechanical installer.
- 02.04 Describe the occupational requirements of a marine welder fabricator.

03.0 DEMONSTRATE PROFICIENCY IN PREPARING SURFACES AND APPLYING MARINE PAINT FINISHES--The student will be able to:

- 03.01 Prepare wood surfaces for painting.
- 03.02 Prepare aluminum surfaces for painting.
- 03.03 Prepare steel surfaces for painting.
- 03.04 Apply paint to surfaces by brush.
- 03.05 Apply paint to surfaces by spray gun.

04.0 DEMONSTRATE PROFICIENCY IN PREPARING SURFACES AND REFINISHING FIBERGLASS--The student will be able to:

- 04.01 Prepare raw fiberglass surfaces for painting.
- 04.02 Repair and refinish fiberglass surfaces.

05.0 DEMONSTRATE PROFICIENCY IN MARINE TERMINOLOGY--The student will be able to:

- 05.01 Use correct marine terminology.
- 05.02 Use correct marine technical terminology.

06.0 DEMONSTRATE PROFICIENCY IN SAFETY PRACTICES IN MARINE OCCUPATIONS--The student will be able to:

- 06.01 Demonstrate the safe use of hand tools in marine occupations.
- 06.02 Demonstrate the safe use of power tools in marine occupations.

06.03 Demonstrate the safe use of paints, chemicals, fiberglass and compounds.
06.04 Demonstrate the safe use of electrical connectors, cords and tools.
06.05 Apply shop safety rules.

07.0 DEMONSTRATE THE ABILITY TO PROPERLY HANDLE LINES AND RELATED OPERATIONS IN SECURING A VESSEL--The student will be able to:

07.01 Identify the correct nautical knots used in securing a vessel.
07.02 Identify the current terminology of lines.
07.03 Demonstrate slowing a vessel in dock.
07.04 Place fenderboards to protect a vessel
07.05 Connect ancillary services to a moored vessel.

08.0 DEMONSTRATE PROFICIENCY IN COORDINATING THE MANUFACTURING, REPAIR AND REFINISHING OPERATIONS IN THE MARINE INDUSTRY--The student will be able to:

08.01 Identify the different types of work processes.
08.02 Identify the sequential order of work processes.
08.03 Demonstrate the ability to coordinate the work processes in the boatyard manufacturing or refurbishing environment.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

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11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Identify documents which may be required when applying for a job interview.
12.04 Complete a job application form correctly.
12.05 Demonstrate competence in job interview techniques.
12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other employees.
12.07 Identify acceptable work habits.
12.08 Demonstrate knowledge of how to make job changes appropriately.
12.09 Demonstrate acceptable employee health habits.
12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.
13.05 Identify the necessary personal characteristics of a successful entrepreneur.
13.06 Identify the business skills needed to operate a small business efficiently and effectively.

Program: 8751300 Boat and Yacht Repair/Refinishing

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751310
Course Title: Boat and Yacht Repair/Refinishing 1
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to orient the student to aspects of the marine manufacturing industry, related occupations. Also, content includes safety, marine terminology, and related math and language skills.

01.0 DISTINGUISH THE DIFFERENT TYPES OF MARINE MANUFACTURING INDUSTRIES--The student will be able to:

- 01.01 Explain the process of manufacturing motor yachts.
- 01.02 Explain the process of manufacturing sail boats.
- 01.03 Explain the process of manufacturing small power boats.
- 01.04 Explain the process of manufacturing center console boats.
- 01.05 Explain the process of manufacturing of commercial work boats.

02.0 DESCRIBE THE DIFFERENT TYPES OF MARINE TRADES AND OCCUPATIONS--The student will be able to:

- 02.01 Describe the occupational requirements of a boat finisher/painter.
- 02.02 Describe the occupational requirements of a marine carpenter.
- 02.03 Describe the occupational requirements of a marine mechanical installer.
- 02.04 Describe the occupational requirements of a marine welder fabricator.

05.0 DEMONSTRATE PROFICIENCY IN MARINE TERMINOLOGY--The student will be able to:

- 05.01 Use correct marine terminology.
- 05.02 Use correct marine technical terminology.

06.0 DEMONSTRATE PROFICIENCY IN SAFETY PRACTICES IN MARINE OCCUPATIONS--The student will be able to:

- 06.01 Demonstrate the safe use of hand tools in marine occupations.
- 06.02 Demonstrate the safe use of power tools in marine occupations.
- 06.03 Demonstrate the safe use of paints, chemicals, fiberglass and compounds.
- 06.04 Demonstrate the safe use of electrical connectors, cords and tools.
- 06.05 Apply shop safety rules.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.

09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.

09.03 Read and follow written and oral instructions.

09.04 Answer and ask questions coherently and concisely.

09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.

09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

Program: 8751300 Boat and Yacht Repair/Refinishing

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751320
Course Title: Boat and Yacht Repair/Refinishing 2
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to provide training in handling lines and securing a vessel in dock for repair.

07.0 DEMONSTRATE THE ABILITY TO PROPERLY HANDLE LINES AND RELATED OPERATIONS IN SECURING A VESSEL--The student will be able to:

- 07.01 Identify the correct nautical knots used in securing a vessel.
- 07.02 Identify the current terminology of lines.
- 07.03 Demonstrate slowing a vessel in dock.
- 07.04 Place fenderboards to protect a vessel
- 07.05 Connect ancillary services to a moored vessel.

Program: 8751300 Boat and Yacht Repair/Refinishing

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751330
Course Title: Boat and Yacht Repair/Refinishing 3
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to provide training in skills related to preparation and painting of marine finishes on wood, aluminum, and steel boats and yachts.

03.0 DEMONSTRATE PROFICIENCY IN PREPARING SURFACES AND APPLYING MARINE PAINT FINISHES--The student will be able to:

- 03.01 Prepare wood surfaces for painting.
- 03.02 Prepare aluminum surfaces for painting.
- 03.03 Prepare steel surfaces for painting.
- 03.04 Apply paint to surfaces by brush.
- 03.05 Apply paint to surfaces by spray gun.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 11.02 Draw conclusions or make inferences from data.
- 11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

Program: 8751300 Boat and Yacht Repair/Refinishing

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751340
Course Title: Boat and Yacht Repair/Refinishing 4
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to provide training in skills related to preparing surfacers and refinishing fiberglass.

04.0 DEMONSTRATE PROFICIENCY IN PREPARING SURFACES AND REFINISHING FIBERGLASS--The student will be able to:

04.01 Prepare raw fiberglass surfaces for painting.
04.02 Repair and refinish fiberglass surfaces.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751350
Course Title: Boat and Yacht Repair/Refinishing 5
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is provide training in entrepreneurship skills.

08.0 DEMONSTRATE PROFICIENCY IN COORDINATING THE MANUFACTURING, REPAIR AND REFINISHING OPERATIONS IN THE MARINE INDUSTRY--The student will be able to:

- 08.01 Identify the different types of work processes.
- 08.02 Identify the sequential order of work processes.
- 08.03 Demonstrate the ability to coordinate the work processes in the boatyard manufacturing or refurbishing environment.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 13.01 Define entrepreneurship.
- 13.02 Describe the importance of entrepreneurship to the American economy.
- 13.03 List the advantages and disadvantages of business ownership.
- 13.04 Identify the risks involved in ownership of a business.
- 13.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 13.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751360
Course Title: Boat and Yacht Repair/Refinishing 6
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to provide training in employability skills.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Identify documents which may be required when applying for a job interview.
12.04 Complete a job application form correctly.
12.05 Demonstrate competence in job interview techniques.
12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other employees.
12.07 Identify acceptable work habits.
12.08 Demonstrate knowledge of how to make job changes appropriately.
12.09 Demonstrate acceptable employee health habits.
12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Boatbuilding - Wood and Fabricated
Occupational Area:	Industrial Education
	Secondary
Program Numbers	**8721000**
CIP Number	0648.079902
Grade Level	9-12, 30, 31
Length	6 credits
Certification	CAB WOODWK @7 G
	CARPENTRY @7 G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as shipfitters (89121705), or boat builders, (DOT 860.361-010).

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, use of fiberglass and marine woodworking skills, frame building, painting and installation of hardware and simple electrical and mechanical systems. A program may be structured to emphasize either wood or fabricated boatbuilding but does not have to cover both areas comprehensively.

Listed below are the courses that comprise this program when offered at the secondary level:

8721010 - Boatbuilding - Wood and Fabricated 1
8721020 - Boatbuilding - Wood and Fabricated 2
8721030 - Boatbuilding - Wood and Fabricated 3
8721040 - Boatbuilding - Wood and Fabricated 4
8721050 - Boatbuilding - Wood and Fabricated 5
8721060 - Boatbuilding - Wood and Fabricated 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Boatbuilding industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program and provide instruction in fiberglass lamination and fabrication, gelcoat repair, boat woodworking operations, painting and servicing basic systems in a boatyard manufacturing or refurbishing environment.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational

skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction is appropriate for this program. Whenever the cooperative method is offered, the following is required for each student: a training agreement, a training plan signed by the student, teacher and employer, including instructional objectives and a list of on-the-job and in-school learning experiences and a work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must be paid for work performed.

The outcomes and student performance standards which the handicapped student must master must be specified in each student's Individual Education Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Apply trade accepted terminology and safety.
02.0 Perform hand lamination operations.
03.0 Repair gelcoat.
04.0 Perform framing operations.
05.0 Perform trim operations.
06.0 Install and service mechanical systems.
07.0 Install wiring systems.
08.0 Perform fiberglass fabrication operations.
09.0 Perform assembly woodworking operations.
10.0 Construct molds.
11.0 Repair fiberglass.
12.0 Apply paint.
13.0 Repair wooden boats.
14.0 Service piping/wiring systems.
15.0 Demonstrate appropriate communication skills.
16.0 Demonstrate appropriate math skills.
17.0 Demonstrate appropriate understanding of basic science.
18.0 Demonstrate employability skills.
19.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Boatbuilding - Wood And Fabricated
Secondary Number: 8721000
Postsecondary Number:

01.0 APPLY TRADE ACCEPTED TERMINOLOGY AND SAFETY--The student will be able to:

- 01.01 Use curriculum modules.
- 01.02 Use work schedule and progress chart.
- 01.03 Use marine and technical terminology.
- 01.04 Apply shop safety rules.

02.0 PERFORM HAND LAMINATION OPERATIONS--The student will be able to:

- 02.01 Identify tools, materials and precautions.
- 02.02 Lay up mat laminates.
- 02.03 Lay up woven laminates.
- 02.04 Lay up directional laminates.
- 02.05 Apply reinforced structural bonds.
- 02.06 Cut and grind laminates to specifications.

03.0 REPAIR GELCOAT--The student will be able to:

- 03.01 Identify tools, materials and precautions.
- 03.02 Sand and buff gelcoat.
- 03.03 Repair gelcoat with putty.
- 03.04 Repair gelcoat with spray equipment.

04.0 PERFORM FRAMING OPERATIONS--The student will be able to:

- 04.01 Use frame plans and tools.
- 04.02 Layout dimensions from plans.
- 04.03 Fit bulkheads.
- 04.04 Fit faces and tops.

05.0 PERFORM TRIM OPERATIONS--The student will be able to:

- 05.01 Identify tools and precautions.
- 05.02 Identify and apply flat trim moldings.
- 05.03 Identify and apply cap and corner moldings.
- 05.04 Hang compartment door.
- 05.05 Install hull-side paneling.
- 05.06 Install cabinet doors and drawers.

06.0 INSTALL AND SERVICE MECHANICAL SYSTEMS--The student will be able to:

- 06.01 Identify tools and precautions.
- 06.02 Perform routine engine service.
- 06.03 Maintain mechanical steering.

06.04 Repair rigging.
06.05 Install deck hardware.

07.0 INSTALL WIRING SYSTEMS--The student will be able to:

07.01 Identify tools, materials and precautions.
07.02 Install batteries.
07.03 Select DC conductor size.
07.04 Install DC lighting.

08.0 PERFORM FIBERGLASS FABRICATION OPERATIONS--The student will be able to:

08.01 Operate chop gun.
08.02 Prepare and apply bonding putty.
08.03 Identify and apply core materials.
08.04 Fabricate parts by vacuum molding.
08.05 Prepare mold for gelcoat.
08.06 Operate gel gun.
08.07 Pull parts.
08.08 Repair molds.
08.09 Maintain molds.

09.0 PERFORM ASSEMBLY WOODWORKING OPERATIONS--The student will be able to:

09.01 Level hull and set up cross beams.
09.02 Fabricate and install sub-sole components.
09.03 Fabricate and install sole.
09.04 Construct router, shaper, and tracing patterns.
09.05 Cut bulkheads from patterns.
09.06 Construct straight moldings and posts.
09.07 Construct turn corner moldings and posts.
09.08 Construct solid and laminated curved moldings.

10.0 CONSTRUCT MOLDS--The student will be able to:

10.01 Prepare plug for mold lamination.
10.02 Gel and skin mold.
10.03 Laminate mold.
10.04 Brace and pull mold.
10.05 Prepare mold for the first use.

11.0 REPAIR FIBERGLASS--The student will be able to:

11.01 Install point loads and stiffeners.
11.02 Repair laminates.
11.03 Renew bottom paint.

12.0 APPLY PAINT--The student will be able to:

12.01 Identify materials and precautions.
12.02 Repair/prepare surface.
12.03 Apply and prepare primer.

12.04 Apply masking and pull tapes.
12.05 Apply paint with spray equipment.

13.0 REPAIR WOODEN BOATS--The student will be able to:

13.01 Identify wooden boat construction type.
13.02 Repair plank-on-frames construction.
13.03 Use epoxy resin in restoration/repair.
13.04 Maintain wooden boats.

14.0 SERVICE PIPING/WIRING SYSTEMS--The student will be able to:

14.01 Maintain fuel systems.
14.02 Maintain sewage systems.
14.03 Troubleshoot DC systems.

15.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

15.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
15.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
15.03 Read and follow written and oral instructions.
15.04 Answer and ask questions coherently and concisely.
15.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
15.06 Demonstrate appropriate telephone/communication skills.

16.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

16.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
16.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
16.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
16.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
16.05 Demonstrate an understanding of federal, state and local taxes and their computation.

17.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

17.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
17.02 Draw conclusions or make inferences from data.
17.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

17.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct a job search.
18.02 Secure information about a job.
18.03 Identify documents which may be required when applying for a job interview.
18.04 Complete a job application form correctly.
18.05 Demonstrate competence in job interview techniques.
18.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
18.07 Identify acceptable work habits.
18.08 Demonstrate knowledge of how to make appropriate job changes.
18.09 Demonstrate acceptable employee health habits.
18.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

19.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

19.01 Define entrepreneurship.
19.02 Describe the importance of entrepreneurship to the American economy.
19.03 List the advantages and disadvantages of business ownership.
19.04 Identify the risks involved in ownership of a business.
19.05 Identify the necessary personal characteristics of a successful entrepreneur.
19.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721010
Course Title: Boatbuilding - Wood and Fabricated 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide an introduction of the related trade terminology, safety rules and regulation, communication and human relation skills.

01.0 APPLY TRADE ACCEPTED TERMINOLOGY AND SAFETY--The student will be able to:

- 01.01 Use curriculum modules.
- 01.02 Use work schedule and progress chart.
- 01.03 Use marine and technical terminology.
- 01.04 Apply shop safety rules.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 18.01 Conduct a job search.
- 18.02 Secure information about a job.
- 18.03 Identify documents which may be required when applying for a job interview.
- 18.04 Complete a job application form correctly.
- 18.05 Demonstrate competence in job interview techniques.
- 18.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
- 18.07 Identify acceptable work habits.
- 18.08 Demonstrate knowledge of how to make appropriate job changes.
- 18.09 Demonstrate acceptable employee health habits.
- 18.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

19.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 19.01 Define entrepreneurship.
- 19.02 Describe the importance of entrepreneurship to the American economy.
- 19.03 List the advantages and disadvantages of business ownership.
- 19.04 Identify the risks involved in ownership of a business.
- 19.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 19.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721020
Course Title: Boatbuilding - Wood and Fabricated 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in hand laminating framing and assembling wood working operations.

02.0 PERFORM HAND LAMINATION OPERATIONS--The student will be able to:

- 02.01 Identify tools, materials and precautions.
- 02.02 Lay up mat laminates.
- 02.03 Lay up woven laminates.
- 02.04 Lay up directional laminates.
- 02.05 Apply reinforced structural bonds.
- 02.06 Cut and grind laminates to specifications.

04.0 PERFORM FRAMING OPERATIONS--The student will be able to:

- 04.01 Use frame plans and tools.
- 04.02 Layout dimensions from plans.
- 04.03 Fit bulkheads.
- 04.04 Fit faces and tops.

09.0 PERFORM ASSEMBLY WOODWORKING OPERATIONS--The student will be able to:

- 09.01 Level hull and set up cross beams.
- 09.02 Fabricate and install sub-sole components.
- 09.03 Fabricate and install sole.
- 09.04 Construct router, shaper, and tracing patterns.
- 09.05 Cut bulkheads from patterns.
- 09.06 Construct straight moldings and posts.
- 09.07 Construct turn corner moldings and posts.
- 09.08 Construct solid and laminated curved moldings.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721030
Course Title: Boatbuilding - Wood and Fabricated 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the techniques of constructing and using a mold for fiberglass fabrication.

08.0 PERFORM FIBERGLASS FABRICATION OPERATIONS--The student will be able to:

- 08.01 Operate chop gun.
- 08.02 Prepare and apply bonding putty.
- 08.03 Identify and apply core materials.
- 08.04 Fabricate parts by vacuum molding.
- 08.05 Prepare mold for gelcoat.
- 08.06 Operate gel gun.
- 08.07 Pull parts.
- 08.08 Repair molds.
- 08.09 Maintain molds.

10.0 CONSTRUCT MOLDS--The student will be able to:

- 10.01 Prepare plug for mold lamination.
- 10.02 Gel and skin mold.
- 10.03 Laminate mold.
- 10.04 Brace and pull mold.
- 10.05 Prepare mold for the first use.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721040
Course Title: Boatbuilding - Wood and Fabricated 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the application of trims, and required hardware, pointing application and the servicing of the mechanical system.

05.0 PERFORM TRIM OPERATIONS--The student will be able to:

- 05.01 Identify tools and precautions.
- 05.02 Identify and apply flat trim moldings.
- 05.03 Identify and apply cap and corner moldings.
- 05.04 Hang compartment door.
- 05.05 Install hull-side paneling.
- 05.06 Install cabinet doors and drawers.

06.0 INSTALL AND SERVICE MECHANICAL SYSTEMS--The student will be able to:

- 06.01 Identify tools and precautions.
- 06.02 Perform routine engine service.
- 06.03 Maintain mechanical steering.
- 06.04 Repair rigging.
- 06.05 Install deck hardware.

12.0 APPLY PAINT--The student will be able to:

- 12.01 Identify materials and precautions.
- 12.02 Repair/prepare surface.
- 12.03 Apply and prepare primer.
- 12.04 Apply masking and pull tapes.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721050
Course Title: Boatbuilding - Wood and Fabricated 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the installation of the wiring and piping systems of boatbuilding and repairing.

07.0 INSTALL WIRING SYSTEMS--The student will be able to:

- 07.01 Identify tools, materials and precautions.
- 07.02 Install batteries.
- 07.03 Select DC conductor size.
- 07.04 Install DC lighting.

14.0 SERVICE PIPING/WIRING SYSTEMS--The student will be able to:

- 14.01 Maintain fuel systems.
- 14.02 Maintain sewage systems.
- 14.03 Troubleshoot DC systems.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721060
Course Title: Boatbuilding - Wood and Fabricated 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the tools, methods and techniques of boat maintenance repairing of gelcoat, fiberglass wood and metal boat repair.

03.0 REPAIR GELCOAT--The student will be able to:

- 03.01 Identify tools, materials and precautions.
- 03.02 Sand and buff gelcoat.
- 03.03 Repair gelcoat with putty.
- 03.04 Repair gelcoat with spray equipment.

11.0 REPAIR FIBERGLASS--The student will be able to:

- 11.01 Install point loads and stiffeners.
- 11.02 Repair laminates.
- 11.03 Renew bottom paint.

13.0 REPAIR WOODEN BOATS--The student will be able to:

- 13.01 Identify wooden boat construction type.
- 13.02 Repair plank-on-frames construction.
- 13.03 Use epoxy resin in restoration/repair.
- 13.04 Maintain wooden boats.

15.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 15.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 15.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 15.03 Read and follow written and oral instructions.
- 15.04 Answer and ask questions coherently and concisely.
- 15.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 15.06 Demonstrate appropriate telephone/communication skills.

16.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 16.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

16.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

16.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

16.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

16.05 Demonstrate an understanding of federal, state and local taxes and their computation.

17.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

17.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

17.02 Draw conclusions or make inferences from data.

17.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

17.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Boatbuilding - Wood and Fabricated Technology
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I480799**
CIP Number	0648.079901
Grade Level	30, 31
Length	1360 hours
Certification	CAB WOODWK @7 G
	CARPENTRY @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as shipfitters (89121705) and boat builders, (DOT 860.361-010), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, fiberglass and marine working skills, mechanical systems, piping systems, electrical systems, and frame and form building. A program may be structured to emphasize either wood or fabricated boatbuilding but does not have to cover both areas comprehensively.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Boatbuilding industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in boat framing, mold building, fiberglass lamination and fabrication, millwork operations, installation of mechanical, electrical and piping systems, plug construction and finishing, painting and wooden boat repair.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction is appropriate for this program. Whenever the cooperative method is offered, the following is required for each student: a training agreement, a training plan signed by the student, teacher and employer, including instructional objectives and a list of on-the-job and in-school learning experiences and a work station which reflects equipment, skills and tasks which are relevant to the

occupation which the student has chosen as a career goal. The student must be paid for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 7.0, Language 7.0, Reading 7.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1360 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Apply trade accepted terminology and safety.
02.0 Perform hand lamination operations.
03.0 Repair gelcoat.
04.0 Perform framing operations.
05.0 Perform trim operations.
06.0 Perform millwork operations.
07.0 Install mechanical systems.
08.0 Install piping systems.
09.0 Install wiring systems.
10.0 Perform fiberglass fabrication operations.
11.0 Perform assembly woodworking operations.
12.0 Perform plug construction operations.
13.0 Perform plug finishing operations.
14.0 Construct molds.
15.0 Repair fiberglass.
16.0 Apply paint.
17.0 Repair wooden boats.
18.0 Service mechanical systems.
19.0 Service piping and wiring systems.
20.0 Demonstrate appropriate communication skills.
21.0 Demonstrate appropriate math skills.
22.0 Demonstrate appropriate understanding of basic science.
23.0 Demonstrate employability skills.
24.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Boatbuilding - Wood And Fabricated Technology
Secondary Number:
Postsecondary Number: I480799

01.0 APPLY TRADE ACCEPTED TERMINOLOGY AND SAFETY--The student will be able to:

- 01.01 Use curriculum modules.
- 01.02 Clarify career values.
- 01.03 Use work schedule and progress chart.
- 01.04 Use marine and technical terminology.
- 01.05 Apply shop safety rules.

02.0 PERFORM HAND LAMINATION--The student will be able to:

- 02.01 Identify tools, materials and precautions.
- 02.02 Lay up mat laminates.
- 02.03 Lay up woven laminates.
- 02.04 Lay up directional laminates.
- 02.05 Apply reinforced structural bonds.
- 02.06 Cut and grind laminates to specifications.

03.0 REPAIR GELCOAT--The student will be able to:

- 03.01 Identify tools, materials and precautions.
- 03.02 Sand and buff gelcoat.
- 03.03 Repair gelcoat with putty.
- 03.04 Repair gelcoat with spray equipment.

04.0 PERFORM FRAMING OPERATIONS--The student will be able to:

- 04.01 Use frame plans and tools.
- 04.02 Layout dimensions from plans.
- 04.03 Fit bulkheads.
- 04.04 Fit faces and tops.

05.0 PERFORM TRIM OPERATIONS--The student will be able to:

- 05.01 Identify tools and precautions.
- 05.02 Identify and apply flat trim moldings.
- 05.03 Identify and apply cap and corner moldings.
- 05.04 Hang compartment door.
- 05.05 Install hull-side paneling.
- 05.06 Install cabinet doors and drawers.

06.0 PERFORM MILLWORK OPERATIONS--The student will be able to:

- 06.01 Operate router and shaper.
- 06.02 Operate table saw and radial arm saw.
- 06.03 Fabricate cabinetry from plans.

06.04 Apply plastic laminates to cabinetry.
06.05 Operate jointer and surface planer.
06.06 Operate band saw.

07.0 INSTALL MECHANICAL SYSTEMS--The student will be able to:

07.01 Identify tools and precautions.
07.02 Fabricate and install machinery foundations.
07.03 Install engine and shaft line.
07.04 Install mechanical and hydraulic steering.
07.05 Install deck hardware.

08.0 INSTALL PIPING SYSTEMS--The student will be able to:

08.01 Identify tools, materials, and precautions.
08.02 Install through-hull devices.
08.03 Install bilge pump.
08.04 Install tank supports and tank.
08.05 Install hand pump water system.
08.06 Install pressurized water system.
08.07 Install PVC-slip drain system.
08.08 Install engine cooling and exhaust.
08.09 Install fuel systems.

09.0 INSTALL WIRING SYSTEMS--The student will be able to:

09.01 Identify tools, materials, and precautions.
09.02 Install batteries.
09.03 Select DC conductor size.
09.04 Install DC service equipment.
09.05 Install DC lighting and motor circuits.
09.06 Install starting and charging circuits.
09.07 Install bonding and cathodic protection.
09.08 Install AC service equipment.
09.09 Install AC lighting and receptacle circuits.
09.10 Install on-board generator.

10.0 PERFORM FIBERGLASS FABRICATION--The student will be able to:

10.01 Operate chop gun.
10.02 Prepare and apply bonding putty.
10.03 Identify and apply core materials.
10.04 Fabricate parts by vacuum molding.
10.05 Prepare mold for gelcoat.
10.06 Operate gel gun.
10.07 Pull parts.
10.08 Repair molds.
10.09 Maintain molds.

11.0 PERFORM ASSEMBLY WOODWORKING OPERATIONS--The student will be able to:

11.01 Level hull and set up cross-beams.
11.02 Fabricate and install sub-sole components.
11.03 Fabricate and install sail.

11.04 Construct router, shaper, and tracing patterns.
11.05 Cut bulkheads from patterns.
11.06 Construct straight moldings and posts.
11.07 Construct turned corner moldings and posts.
11.08 Construct solid and laminated curved moldings.

12.0 PERFORM PLUG CONSTRUCTION OPERATIONS--The student will be able to:

12.01 Identify components of lines drawings.
12.02 Lay down lines from offsets.
12.03 Pick up body plan.
12.04 Construct patterns and frames.
12.05 Construct, fasten, and fair stringers.
12.06 Apply planking material.

13.0 PERFORM PLUG FINISHING OPERATIONS--The student will be able to:

13.01 Glaze and sheath plug.
13.02 Fill and prime plug.
13.03 Fair plug.
13.04 Prepare and apply finish coat.
13.05 Polish finish coat.

14.0 CONSTRUCT MOLDS--The student will be able to:

14.01 Prepare plug for mold lamination.
14.02 Gel and skin mold.
14.03 Laminate mold.
14.04 Brace and pull mold.
14.05 Prepare mold for first use.

15.0 REPAIR FIBERGLASS--The student will be able to:

15.01 Install point loads and stiffeners.
15.02 Repair laminates.
15.03 Renew bottom paint.

16.0 APPLY PAINT--The student will be able to:

16.01 Identify materials and precautions.
16.02 Repair/prepare surface.
16.03 Apply and prepare primer.
16.04 Apply masking and pull tapes.
16.05 Apply paint with spray equipment.

17.0 REPAIR WOODEN BOATS--The student will be able to:

17.01 Identify wooden boat construction types.
17.02 Repair plank-on-frame construction.
17.03 Use epoxy resin in restoration/repair.
17.04 Maintain wooden boats.

18.0 SERVICE MECHANICAL SYSTEMS--The student will be able to:

18.01 Perform routine engine service.
18.02 Maintain hydraulic steering systems.
18.03 Repair and maintain mechanical steering.
18.04 Inspect mast, boom, and rigging.
18.05 Repair rigging.

19.0 SERVICE PIPING AND WIRING SYSTEMS--The student will be able to:

19.01 Maintain and repair portable water systems.
19.02 Maintain and repair fuel systems.
19.03 Install and maintain sewage systems.
19.04 Troubleshoot DC systems.
19.05 Troubleshoot AC systems.

20.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

20.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
20.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
20.03 Read and follow written and oral instructions.
20.04 Answer and ask questions coherently and concisely.
20.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
20.06 Demonstrate appropriate telephone/communication skills.

21.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

21.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
21.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
21.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
21.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
21.05 Demonstrate an understanding of federal, state and local taxes and their computation.

22.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

22.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
22.02 Draw conclusions or make inferences from data.
22.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
22.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

23.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

23.01 Conduct a job search.
23.02 Secure information about a job.
23.03 Identify documents which may be required when applying for a job interview.
23.04 Complete a job application form correctly.
23.05 Demonstrate competence in job interview techniques.
23.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
23.07 Identify acceptable work habits.
23.08 Demonstrate knowledge of how to make appropriate job changes.
23.09 Demonstrate acceptable employee health habits.
23.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

24.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

24.01 Define entrepreneurship.
24.02 Describe the importance of entrepreneurship to the American economy.
24.03 List the advantages and disadvantages of business ownership.
24.04 Identify the risks involved in ownership of a business.
24.05 Identify the necessary personal characteristics of a successful entrepreneur.
24.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Building Construction Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.100101
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as a construction manager (15017016), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, construction practices, building codes, blueprint reading, personnel and resource management skills, safety, site selection and planning and building residential and commercial structures.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Construction industry: planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in steel and wood construction methods, construction materials, occupational safety, building codes, and building inspections.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum

content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Communicate effectively.
02.0 Identify, select and supervise application of construction materials.
03.0 Produce, read and interpret drawings and specifications.
04.0 Interpret and apply codes, regulations, and contract documents.
05.0 Survey and investigate construction sites.
06.0 Select and maintain construction site tools and equipment.
07.0 Interpret basic designs and apply sound construction principles.
08.0 Take off quantities and estimate costs.
09.0 Plan, coordinate, schedule and control projects.
10.0 Perform tests and inspections.
11.0 Select, train and supervise personnel.
12.0 Demonstrate efficient office and administrative procedures.
13.0 Demonstrate appropriate math skills.
14.0 Demonstrate appropriate understanding of basic science.
15.0 Demonstrate employability skills.
16.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Building Construction Technology
Secondary Number:
Postsecondary Number: 0615.100101

01.0 COMMUNICATE EFFECTIVELY--The student will be able to:

- 01.01 Maintain notice board.
- 01.02 Maintain job diary.
- 01.03 Prepare inter-office memos.
- 01.04 Prepare business correspondence.
- 01.05 Set-up surveyors field book.
- 01.06 Prepare daily project report.
- 01.07 Prepare requisitions for equipment and materials.
- 01.08 Write specifications for equipment purchase.
- 01.09 Prepare minutes from job-site meetings.
- 01.10 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 01.11 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 01.12 Read and follow written and oral instructions.
- 01.13 Answer and ask questions coherently and concisely.
- 01.14 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 01.15 Demonstrate appropriate telephone/communication skills.

02.0 IDENTIFY, SELECT, AND SUPERVISE APPLICATION OF CONSTRUCTION MATERIALS--The student will be able to:

- 02.01 Select cleaning materials.
- 02.02 Select soils.
- 02.03 Identify soil types.
- 02.04 Select wood framing.
- 02.05 Select rough hardware.
- 02.06 Select waterproofing and protective coatings.
- 02.07 Select insulation and vapor barriers.
- 02.08 Select ceiling finishes and wall finishes.
- 02.09 Select form work materials.
- 02.10 Select concrete.
- 02.11 Select windows and doors.
- 02.12 Select adhesives and sealants.
- 02.13 Select roofing materials.
- 02.14 Select sheet metal materials.
- 02.15 Select mill work.
- 02.16 Select painting and decorating materials.
- 02.17 Select miscellaneous metals.
- 02.18 Select asphaltic materials.
- 02.19 Select masonry materials.
- 02.20 Select manufactured specialties.
- 02.21 Select reinforcing concrete materials.

02.22 Select structural steel.
02.23 Select finishing hardware.
02.24 Select foundation piling and casing materials.
02.25 Select precast concrete materials.
02.26 Select plumbing and drainage material.
02.27 Select electrical components and equipment.
02.28 Identify mechanical components and equipment.

03.0 PRODUCE, READ, AND INTERPRET DRAWINGS AND SPECIFICATIONS--The student will be able to:

03.01 Identify, select and use drafting instruments.
03.02 Use technical lettering.
03.03 Identify and use architectural symbols.
03.04 Use drafting reproduction equipment.
03.05 Take site notes and measurements.
03.06 Identify and use electrical symbols.
03.07 Prepare site sketches.
03.08 Identify and use mechanical symbols.
03.09 Identify and use topographical symbols.
03.10 Interpret land surveyor's notes.
03.11 Prepare topographic drawings.
03.12 Prepare working sketches and "as built" drawings.
03.13 Prepare architectural drawings.
03.14 Interpret architectural drawings and specifications.
03.15 Evaluate finishing hardware schedules.
03.16 Prepare structural drawings.
03.17 Interpret structural drawings and specifications.
03.18 Interpret reinforcing steel drawings and bar list.
03.19 Interpret and apply A.S.T.M. standards.
03.20 Interpret and apply C.S.A. standards.
03.21 Prepare presentation drawings.
03.22 Evaluate shop drawings.
03.23 Prepare mechanical drawings.
03.24 Interpret mechanical drawings and specifications.
03.25 Prepare electrical drawings.
03.26 Interpret electrical drawings and specifications.

04.0 INTERPRET AND APPLY LAWS, CODES, REGULATIONS, AND CONTRACT DOCUMENTS--The student will be able to:

04.01 Interpret federal and state safety codes.
04.02 Interpret pre-qualification documents.
04.03 Interpret, apply, and control addenda.
04.04 Interpret bonding insurance procedures.
04.05 Interpret, apply, and control change orders.
04.06 Interpret and apply state standard building code.
04.07 Interpret and apply workmen's compensation requirements.
04.08 Interpret and apply standard form of tender.
04.09 Compile a complete set of contract documents.
04.10 Interpret and apply contracts and mechanics lien act.

05.0 SURVEY AND INVESTIGATE CONSTRUCTION SITES--The student will be able to:

05.01 Lay out and measure site.
05.02 Use surveying rods.
05.03 Make measurements utilizing surveying rods and levels.
05.04 Make measurement using transit.
05.05 Survey construction sites.
05.06 Evaluate site and existing services for services required.
05.07 Survey and lay out building lines and levels.
05.08 Use digital and electronic survey equipment.
05.09 Identify types of sub surface investigations.
05.10 Determine sample requirements.
05.11 Conduct soil test.
05.12 Interpret soil reports.
05.13 Conduct vane shear test.
05.14 Compile boring log.

06.0 SELECT AND MAINTAIN CONSTRUCTION SITE TOOLS AND EQUIPMENT--The student will be able to:

06.01 Select fire fighting equipment.
06.02 Select and maintain safety equipment.
06.03 Select cleaning equipment.
06.04 Select miscellaneous small tools.
06.05 Select and maintain shop and power tools.
06.06 Select surveying equipment.
06.07 Select concrete finishing equipment.
06.08 Select plaster and mortar mixing equipment.
06.09 Select and maintain temporary site offices, storage, and restroom facilities.
06.10 Select temporary building enclosures.
06.11 Select concrete placing equipment.
06.12 Prepare equipment service schedules.
06.13 Evaluate type and size of earth moving equipment needed for the project.
06.14 Select and maintain construction site communication equipment.
06.15 Select concrete batching and mixing equipment.
06.16 Select compaction equipment.
06.17 Identify pile driving and earth boring equipment.
06.18 Select and maintain temporary power and lighting equipment.
06.19 Select and maintain temporary water services.
06.20 Select demolition equipment.
06.21 Select balance of power and plant equipment.

07.0 INTERPRET BASIC DESIGNS AND APPLY CONSTRUCTION PRINCIPLES--The student will be able to:

07.01 Design, erect and maintain staging, scaffolding and falsework.
07.02 Coordinate and supervise resilient flooring.
07.03 Coordinate and supervise painting and finishes.
07.04 Coordinate and supervise windows and doors.
07.05 Coordinate and supervise carpentry and millwork.
07.06 Coordinate and supervise concrete and formwork.
07.07 Coordinate and supervise miscellaneous roofing and sheet metal.
07.08 Coordinate and supervise miscellaneous metal.
07.09 Plan and coordinate excavation and foundation work.

07.10 Coordinate and supervise lath and plaster and dry wall.
07.11 Identify modular and prefabricated applications.
07.12 Coordinate and supervise masonry work.
07.13 Coordinate and supervise tile and terrazzo.
07.14 Design concrete mix.
07.15 Determine strength of concrete.
07.16 Calculate temporary electrical power requirements.
07.17 Design asphaltic hot mix.
07.18 Design pavement structure.
07.19 Calculate modules of electricity.
07.20 Determine moments of inertia.
07.21 Calculate shears and bending moments.
07.22 Calculate deflection.
07.23 Calculate columns.
07.24 Determine strength of lumber.
07.25 Determine strength of steel.
07.26 Design forms and supports.
07.27 Coordinate and supervise structural steel work.
07.28 Coordinate and supervise mechanical work.
07.29 Coordinate and supervise elevator installation.
07.30 Coordinate and supervise electrical installation.

08.0 TAKE OFF QUANTITIES AND ESTIMATE COST--The student will be able to:

08.01 Make calculations.
08.02 Estimate quantities of concrete.
08.03 Compile lists of sub-trades for project.
08.04 Take off quantities of paving.
08.05 Estimate quantities of rough carpentry.
08.06 Obtain and build up material costs.
08.07 Interpret contract document.
08.08 Estimate quantities of framework.
08.09 Estimate quantities of excavation and fill.
08.10 Estimate quantities of landscaping.
08.11 Call sub trade tenders.
08.12 Take off quantities of miscellaneous metals.
08.13 Take off quantities of millwork.
08.14 Take off quantities of structural steel.
08.15 Take off quantities of manufactured specialties.
08.16 Analyze and project plant and equipment costs.
08.17 Analyze and project general condition costs.
08.18 Analyze and project labor unit costs.
08.19 Estimate quantities of reinforcing steel.
08.20 Estimate quantities of masonry.
08.21 Analyze and project site overhead costs.
08.22 Evaluate sub trade bids.
08.23 Summarize project cost and complete tenders prices.

09.0 PLAN, COORDINATE, SCHEDULE AND CONTROL PROJECTS--The student will be able to:

09.01 Prepare daily time sheets.
09.02 Record and control materials received.
09.03 Allocate efficient use of site space.

09.04 Maintain clean and orderly construction site.
09.05 Store materials and equipment.
09.06 Describe units of work measurement.
09.07 Coordinate and control use of construction tools and equipment.
09.08 Prepare progress billing.
09.09 Store chemicals and paints.
09.10 Prepare work schedules.
09.11 Prepare material delivery schedules.
09.12 Expedite delivery of manufactured materials.
09.13 Analyze productivity.
09.14 Prepare sub-trades schedules.
09.15 Prepare and code daily costs.
09.16 Record deficiencies as a result of project inspections.
09.17 Prepare coded cost break downs.
09.18 Take appropriate action to correct project deficiencies.
09.19 Interpret computer output.
09.20 Prepare cash flow schedules.
09.21 Prepare schedules for computer input.
09.22 Develop and maintain coded cost systems.
09.23 Prepare critical path schedule.
09.24 Monitor schedule to control project.

10.0 PERFORM TESTS AND INSPECTIONS--The student will be able to:

10.01 Conduct concrete impact hammer test.
10.02 Conduct concrete slump test.
10.03 Conduct concrete air content test.
10.04 Conduct sieve and hydrometer analysis test.
10.05 Conduct concrete unit weight test.
10.06 Conduct unit weight of aggregate test.
10.07 Calculate fineness modules.
10.08 Conduct lumber moisture content test.
10.09 Conduct liquid and plastics limits tests.
10.10 Check concrete placing and consolidation procedures.
10.11 Conduct moisture content test on soil.
10.12 Check form work.
10.13 Conduct moisture density test.
10.14 Calculate percentage of compaction.
10.15 Conduct density of material in place tests.
10.16 Sample, make, cure and test concrete compressive strength specimen.
10.17 Conduct chemical analysis of water.
10.18 Check reinforcing steel and placing.
10.19 Inspect placing of fill and compaction procedures.
10.20 Conduct compressive strength test on concrete blocks.
10.21 Conduct roofing test.
10.22 Make mortar cubes and perform compressive strength test.
10.23 Conduct soundness test.
10.24 Conduct specific gravity tests.
10.25 Sample, make, cure and test flexual strength specimen.
10.26 Prepare Marshall test specimens.
10.27 Conduct unconfined compression test.
10.28 Conduct density test of Marshall test specimens.
10.29 Calculate air voids and V.M.A. values.

10.30 Calculate bitumen extraction test.
10.31 Conduct C.B.R. test.
10.32 Conduct California sand equivalent test.
10.33 Conduct Rice specific gravity tests.
10.34 Conduct Marshall stability and flow tests.
10.35 Check asphalt mixing plant.
10.36 Conduct abrasion test.
10.37 Conduct permeability test.
10.38 Conduct triaxial compression test.

11.0 SELECT, TRAIN, AND SUPERVISE PERSONNEL--The student will be able to:

11.01 Apply first aid.
11.02 Instruct new employee on company safety regulations.
11.03 Interpret basic company policies.
11.04 Select and hire employees.
11.05 Interview and evaluate perspective employees.
11.06 Evaluate employees' performance.
11.07 Write job description.
11.08 Evaluate employee grievance.
11.09 Interpret labor contracts.

12.0 DEMONSTRATE EFFICIENT OFFICE AND ADMINISTRATIVE PROCEDURES--The student will be able to:

12.01 Organize work area.
12.02 Select and use appropriate forms.
12.03 Develop and maintain filing system.
12.04 Maintain inventory of physical assets.
12.05 Set up and maintain technical reference library.
12.06 Maintain a system for field work authorizations.
12.07 Maintain a system for control and processing contract changes.
12.08 Maintain a system for back charges.
12.09 Interpret basic company accounting procedures.

13.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

13.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
13.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
13.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
13.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
13.05 Demonstrate an understanding of federal, state and local taxes and their computation.

14.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

14.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
14.02 Draw conclusions or make inferences from data.

14.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

14.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

15.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

15.01 Conduct a job search.

15.02 Secure information about a job.

15.03 Identify documents which may be required when applying for a job interview.

15.04 Complete a job application form correctly.

15.05 Demonstrate competence in job interview techniques.

15.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

15.07 Identify acceptable work habits.

15.08 Demonstrate knowledge of how to make appropriate job changes.

15.09 Demonstrate acceptable employee health habits.

15.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

16.01 Define entrepreneurship.

16.02 Describe the importance of entrepreneurship to the American economy.

16.03 List the advantages and disadvantages of business ownership.

16.04 Identify the risks involved in ownership of a business.

16.05 Identify the necessary personal characteristics of a successful entrepreneur.

16.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Building Maintenance Technology
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	Two Occupational Completion Points

	Secondary	PSAV
Program Numbers	**8720300**	**I460401**
CIP Number	0646.040102	0646.040102
Grade Level	9-12, 30, 31	30, 31
Length	7 Credits	1,050 Hours
Certification	BLDG MAINT @7 G	BLDG MAINT @7 G
	BLDG CONST @7 G	BLDG CONST @7 G
Facility Code	203	203
VSO	VICA	VICA
Co-op Method	Yes	Yes
Apprenticeship	Yes	Yes
Basic Skills		
Math		8
Language		8
Reading		8

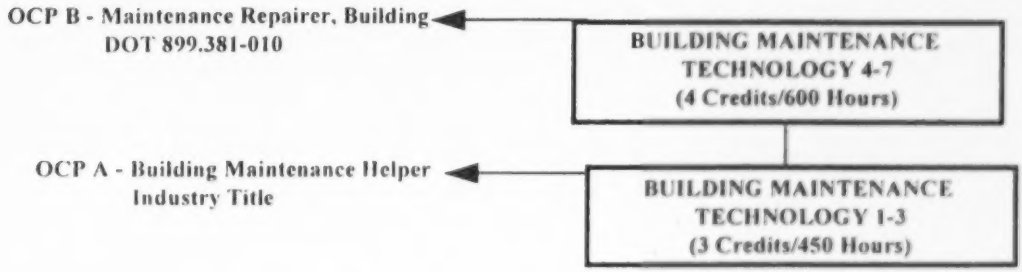
I. **PURPOSE**: The purpose of this program is to prepare students for employment or advanced training in the building maintenance and repair industry. This program also provides supplemental training for persons previously or currently employed in the building maintenance and repair industry.

This program focuses on broad, transferable skills, stresses the understanding of all aspects of the building maintenance and repair industry, and demonstrates such elements of the industry as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

II. **PROGRAM STRUCTURE**: This program is a planned sequence of instruction consisting of two occupational completion points. The recommended sequence allows students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at the first occupational completion point may either continue with the training program or terminate as an occupational completer.

The following diagram illustrates the program structure:

Building Maintenance Technology



At the secondary level, the Building Maintenance Technology program consists of the following courses:

BUILDING MAINTENANCE AND REPAIR COURSES - 3 secondary credits

8720310 - Building Maintenance and Repair 1
8720320 - Building Maintenance and Repair 2
8720330 - Building Maintenance and Repair 3

BUILDING MAINTENANCE TECHNOLOGY COURSES - 4 secondary credits

8720340 - Building Maintenance Technology 4
8720350 - Building Maintenance Technology 5
8720360 - Building Maintenance Technology 6
8720370 - Building Maintenance Technology 7

III. **LABORATORY ACTIVITIES**: Classroom, shop, and laboratory activities are an integral part of this program. These activities include instruction in the use of the safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation. A generic equipment list for this program is available.

IV. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., (VICA) is the appropriate vocational student organization (VSO) for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

This program may be offered in postsecondary adult vocational (PSAV) courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The cooperative method of instruction, is appropriate for this program. Whenever the cooperative method is offered, the following are required for each student: a training agreement, a training plan signed by the student, teacher, and employer, including instructional objectives and a list of on-the-job learning experiences and a work station which

reflects the equipment, skills, and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must be paid for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic-skills grade levels required for postsecondary adult vocational students to exit the program are listed before the intended outcomes for the program. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion of the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) or a remedial lab. Please refer to the Rule for exemptions.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

When a secondary student with a disability is enrolled in a vocational class for which modifications to the curriculum framework have been made, the particular outcomes and student performance standards that the student must master to earn credit must be specified in the student's individual educational plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

SCANS Competencies: To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this program must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

Florida Department of Education
INTENDED OUTCOMES

Program Title: Building Maintenance Technology

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
BUILDING MAINTENANCE HELPER - Industry Title

01.0 Follow safety practices and disaster plans.
02.0 Compute basic maintenance-related math.
03.0 Identify and use basic hand tools.
04.0 Identify power tools and describe their proper operation.
05.0 Identify construction components.
06.0 Describe repair procedures for exterior masonry, stucco, and concrete surfaces.
07.0 Apply appropriate communication and computer skills.
08.0 Demonstrate an understanding of the appropriate basic science.
09.0 Demonstrate employability skills.
10.0 Demonstrate positive public-relations skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
MAINTENANCE REPAIRER, BUILDING - DOT Code 899.381-010

11.0 Identify local, state, and federal codes and regulations.
12.0 Apply appropriate math skills.
13.0 Read contract documents and specifications.
14.0 Describe the operations of heavy equipment and demonstrate the use of power tools.
15.0 Repair and replace interior floors, walls, and ceilings.
16.0 Repair and replace doors, windows, and screens.
17.0 Repair and replace cabinets.
18.0 Prepare and apply finishes to surfaces.
19.0 Repair roofs.
20.0 Troubleshoot, repair, and replace plumbing systems.
21.0 Troubleshoot, repair, and replace electrical systems.
22.0 Maintain, repair, and replace heating, ventilation, and air-cooling (HVAC) systems.
23.0 Perform ground maintenance.
24.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Building Maintenance Technology
Secondary Number: 8720300
Postsecondary Number: I460401

OCCUPATIONAL COMPLETION POINT - DATA CODE A
BUILDING MAINTENANCE HELPER - Industry Title

01.0 FOLLOW SAFETY PRACTICES AND DISASTER PLANS--The student will be able to:

- 01.01 Comply with all applicable Occupational Safety and Health Administration (OSHA) rules and regulations.
- 01.02 Identify and locate the Material Safety Data Sheets (MSDS) and follow the procedures as necessary.
- 01.03 Describe "Florida's Right-to-Know" Law as recorded in the Florida Statutes, Chapter 442.
- 01.04 Identify and use safety equipment.
- 01.05 Identify and follow disaster plans.

02.0 COMPUTE BASIC MAINTENANCE-RELATED MATH--The student will be able to:

- 02.01 Solve job-related problems by adding, subtracting, multiplying, and dividing numbers, using fractions, decimals, and whole numbers.
- 02.02 Change numbers to percents.
- 02.03 Solve job-related problems, using a calculator.
- 02.04 Read a ruler and a tape measure.
- 02.05 Compute feet, inches, and yards.
- 02.06 Change hours and minutes to decimals, fractions, and mixed numbers.
- 02.07 Solve job-related problems, using handbooks, charts, and tables.
- 02.08 Determine ratios and proportions.
- 02.09 Convert measurements from the English to the metric system and from the metric to the English system.

03.0 IDENTIFY AND USE BASIC HAND TOOLS--The student will be able to:

- 03.01 Use a claw hammer to drive and pull out nails.
- 03.02 Use handsaws to cut boards.
- 03.03 Use screwdrivers to drive in screws.
- 03.04 Drill holes with hand-powered drills.
- 03.05 Identify and use various types of:
  - a. wrenches
  - b. pipe wrenches and plumbing tools
  - c. chisels
  - d. staple guns
  - e. wood planes
  - f. woodworking files
  - g. spirit levels
  - h. socket wrench sets

i. hand or block sanders
j. carpenters' squares

04.0 IDENTIFY POWER TOOLS AND DESCRIBE THEIR PROPER OPERATION--The student will be able to:

04.01 Identify power tools, including:
a. sanders
b. drills
c. screwdrivers
d. hand-held saws
e. reciprocating saws
f. radial-arm saws
g. table saws
h. drill presses
i. band saws
j. miter saws
k. planes
l. electric routers

04.02 Describe the proper operation of power tools and equipment.

05.0 IDENTIFY CONSTRUCTION COMPONENTS--The student will be able to:

05.01 Identify the components of various kinds of structures, including:
a. interior walls
b. exterior walls
c. roofs
d. flooring systems

05.02 Identify the types of wall intersections.

05.03 Identify the types and installation procedures of:
a. roof sheathing
b. wall sheathing
c. floor sheathing

05.04 Identify various roof supports.

06.0 DESCRIBE REPAIR PROCEDURES FOR EXTERIOR MASONRY, STUCCO, AND CONCRETE SURFACES--The student will be able to:

06.01 Identify the tools and equipment used for mixing mortar.
06.02 Identify the factors that affect the consistency of mortar.
06.03 Identify the common ratios (M, N, S, and O) of mortar mixtures.
06.04 Identify pointing tools and strike mortar joints.
06.05 Repoint old work.
06.06 Prepare a work area, protecting adjacent areas.
06.07 Apply mortar.
06.08 Identify the methods of putting up the line.
06.09 Identify the types of trowels.
06.10 Identify various types of caulking and application.
06.11 Describe procedures for stucco repair.
06.12 Mix various types of stucco.
06.13 Mix various types of concrete, considering application and pounds per square inch (PSI) strength.
06.14 Identify and select concrete tools.

06.15 Describe the procedures for concrete repair and installation.
06.16 Identify and select cleaning materials and equipment.
06.17 Demonstrate safe and proper procedures for cleaning equipment, materials, work area, and worker.

07.0 APPLY APPROPRIATE COMMUNICATION AND COMPUTER SKILLS--The student will be able to:

07.01 Ask and answer questions coherently and concisely.
07.02 Read and follow written instructions and listen to and follow oral instructions.
07.03 Make oral presentations.
07.04 Write reports using a word-processing software.
07.05 Read and interpret industry-related materials.
07.06 Find information in technical literature such as manufacturer's manuals.
07.07 Read and interpret the graphs, charts, diagrams, and tables commonly used in the industry.
07.08 Complete the forms and invoices commonly used in the industry.
07.09 Demonstrate appropriate telephone communication skills.
07.10 Use trade-related computer software.

08.0 DEMONSTRATE AN UNDERSTANDING OF THE APPROPRIATE BASIC SCIENCE--The student will be able to:

08.01 Explain molecular action as a result of temperature extremes, chemical reaction, and moisture content.
08.02 Draw conclusions or make inferences from data.
08.03 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and demonstrate a knowledge of the proper precautions required for handling such materials.
08.04 Explain pressure measurement in terms of PSI and inches of mercury.
08.05 Explain the use of electrical-system testing devices.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

09.01 Conduct a job search and identify advanced-training opportunities.
09.02 Secure information about a job.
09.03 Identify the documents, including a resume, that may be required for a job application.
09.04 Complete a job-application form.
09.05 Demonstrate competence in job-interview techniques.
09.06 Demonstrate productive work habits and positive attitudes.
09.07 Demonstrate a knowledge of how to make job changes appropriately.
09.08 Demonstrate ethical practices and responsibilities.
09.09 Demonstrate acceptable personal hygiene and a professional appearance.
09.10 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.

09.11 Explain the importance of taking pride in the quality of work performed.
09.12 Describe the importance of a drug-free workplace and industry policies toward drug use.
09.13 Describe the ramifications of a poor driving record on employability opportunities.
09.14 Explain the importance of confidentiality in the workplace.

10.0 DEMONSTRATE POSITIVE PUBLIC-RELATIONS SKILLS--The student will be able to:

10.01 Exercise self-control.
10.02 Identify and demonstrate appropriate responses to criticism.
10.03 Explain the importance of interpersonal skills to success in the industry.
10.04 Demonstrate respect for person and property.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
MAINTENANCE REPAIRER, BUILDING - DOT Code 899.381-010

11.0 IDENTIFY LOCAL, STATE, AND FEDERAL CODES AND REGULATIONS--The student will be able to:

11.01 Identify and locate local, state, and federal codes, regulations, and standards.
11.02 Identify local, state, and federal regulatory agencies.

12.0 APPLY APPROPRIATE MATH SKILLS--The student will be able to:

12.01 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet, and inches.
12.03 Determine the purchase price of materials, including sales tax.
12.04 Calculate the following for a specific job:
a. work hours
b. cost of the workers
c. cost to be charged to the client
12.05 Explain and compute federal, state, and local taxes.
12.06 Calculate the time charged for labor on the job.

13.0 READ CONTRACT DOCUMENTS AND SPECIFICATIONS--The student will be able to:

13.01 Explain the purpose and components of contract documents and specifications.
13.02 Identify and explain the following elements:
a. dimensions
b. construction views
c. section views
d. site plans
e. foundation plans
f. floor plans and elevations
g. details
h. wiring details

13.03 Explain the relationships of the elements of contract documents.
13.04 Identify building symbols.
13.05 Identify lists of materials and specifications.
13.06 Use architectural and engineering scales.

14.0 DESCRIBE THE OPERATIONS OF HEAVY EQUIPMENT AND DEMONSTRATE THE USE OF POWER TOOLS--The student will be able to:

14.01 Identify different types and uses of heavy equipment.
14.02 Describe the operations of different types of heavy equipment.
14.03 Set up, maintain, and demonstrate the use of power tools.

15.0 REPAIR AND REPLACE INTERIOR FLOORS, WALLS, AND CEILINGS--The student will be able to:

15.01 Repair a hole in a drywall.
15.02 Install paneling.
15.03 Install a drywall and finish.
15.04 Check and repair wall coverings.
15.05 Install interior trim.
15.06 Measure the size of a room.
15.07 Replace ceramic tile.
15.08 Repair carpets.
15.09 Repair vinyl composition tile (VCT) and roll flooring.
15.10 Check and repair acoustical ceiling systems.
15.11 Identify the types of insulation.

16.0 REPAIR AND REPLACE DOORS, WINDOWS, AND SCREENS--The student will be able to:

16.01 Install a prehung door and casing.
16.02 Install door hardware.
16.03 Replace doors.
16.04 Check and replace hinges on doors.
16.05 Check and replace closet doors.
16.06 Remove, measure, and replace door and window lights.
16.07 Replace screen on door and window frames.
16.08 Check and repair window-glaze seals.
16.09 Replace sash locks in windows.
16.10 Inspect and replace window operators and locks.
16.11 Check, repair, and install panic bars on doors.
16.12 Repair a window frame.

17.0 REPAIR AND REPLACE CABINETS--The student will be able to:

17.01 Identify the parts of a cabinet.
17.02 Identify the types of cabinet-door installation.
17.03 Identify the types of cabinet hardware.
17.04 Install cabinet hardware.
17.05 Describe cabinet-installation procedures.
17.06 Install cabinet shelving.
17.07 Replace or repair surface materials.

18.0 PREPARE AND APPLY FINISHES TO SURFACES--The student will be able to:

18.01 Erect an extension ladder and a scaffold.
18.02 Prepare the surfaces.
18.03 Apply finished coatings to surfaces with a roller, brush, and sprayer.

19.0 REPAIR ROOFS--The student will be able to:

19.01 Identify and explain different types of roofing systems and applications.
19.02 Check and repair asphalt shingles.
19.03 Check and repair roof gutters and downspouts.
19.04 Seal pipes and vents on roofs.
19.05 Check and repair:
a. sheet-metal roofs
b. built-up roofs
c. roof flashing

20.0 TROUBLESHOOT, REPAIR, AND REPLACE PLUMBING SYSTEMS--The student will be able to:

20.01 Troubleshoot, repair, and replace bathroom fixtures and hardware, such as:
a. lavatory
b. water closet
c. urinal
d. shower
e. bathtub
f. traps
g. drain, waste, and vent (DWV) system
20.02 Troubleshoot, repair, and replace kitchen fixtures and hardware, such as sinks, garbage disposals, faucets, and hot-water-heater tanks.
20.03 Identify and explain various pipes and tubing used in the plumbing trade.
20.04 Test and inspect repaired or replaced plumbing systems.

21.0 TROUBLESHOOT, REPAIR, AND REPLACE ELECTRICAL SYSTEMS--The student will be able to:

21.01 Explain basic electrical theory.
21.02 Explain branch circuit systems.
21.03 Identify and explain ground fault circuit interrupter (GFCI) circuitry.
21.04 Troubleshoot electrical systems, using testing and metering devices.
21.05 Repair and replace electrical:
a. outlets
b. switches
c. light fixtures
21.06 Install and replace breakers and fuses.
21.07 Identify types of wiring raceways.
21.08 Replace hot-water-heater unit component parts.

21.09 Wire a blower motor into an electrical supply.
21.10 Test and inspect repaired or replaced electrical systems.
21.11 Explain basic motor-control operation.

22.0 MAINTAIN, REPAIR, AND REPLACE HEATING, VENTILATION, AND AIR-COOLING (HVAC) SYSTEMS--The student will be able to:

22.01 Explain heating and cooling principles and code requirements.
22.02 Describe methods of calculating heating and cooling loads.
22.03 Explain the operation and types of the following heating methods: water, steam, forced air, gas, electrical components, and heat pumps.
22.04 Troubleshoot and repair a circulation pump, zone valves, burners, pilot lights, and thermocouples in a heating system.
22.05 Identify refrigerants.
22.06 Determine a refrigerant level.
22.07 Describe the proper procedures for descaling air-conditioner units.
22.08 Troubleshoot, repair, and replace air filters, drive belts, and drain systems.
22.09 Troubleshoot, repair, and replace control systems.
22.10 Explain the computer monitoring system associated with heating, ventilation, and air-conditioning (HVAC) control systems and air-quality management.

23.0 PERFORM GROUND MAINTENANCE--The student will be able to:

23.01 Identify common pests.
23.02 Explain basic irrigation theory and design.
23.03 Provide plant, tree, and shrub care.
23.04 Identify ground-maintenance equipment.

24.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

24.01 Define "entrepreneurship."
24.02 Describe the importance of entrepreneurship to the American economy.
24.03 List the advantages and disadvantages of business ownership.
24.04 Identify the risks involved in the ownership of a business.
24.05 Identify the personal characteristics of a successful entrepreneur.
24.06 Identify the business skills needed to operate a small business efficiently and effectively.
24.07 Describe the employer's responsibilities to support the business and industry.

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July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8720310
Course Title: Building Maintenance and Repair 1
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to the building maintenance and repair industry. These competencies include skills and knowledge related to safety practices, math applications, and the use of hand and power tools.

01.0 FOLLOW SAFETY PRACTICES AND DISASTER PLANS--The student will be able to:

- 01.01 Comply with all applicable Occupational Safety and Health Administration (OSHA) rules and regulations.
- 01.02 Identify and locate the Material Safety Data Sheets (MSDS) and follow the procedures as necessary.
- 01.03 Describe "Florida's Right-to-Know" Law as recorded in the Florida Statutes, Chapter 442.
- 01.04 Identify and use safety equipment.
- 01.05 Identify and follow disaster plans.

02.0 COMPUTE BASIC MAINTENANCE-RELATED MATH--The student will be able to:

- 02.01 Solve job-related problems by adding, subtracting, multiplying, and dividing numbers, using fractions, decimals, and whole numbers.
- 02.02 Change numbers to percents.
- 02.03 Solve job-related problems, using a calculator.
- 02.04 Read a ruler and a tape measure.
- 02.05 Compute feet, inches, and yards.
- 02.06 Change hours and minutes to decimals, fractions, and mixed numbers.
- 02.07 Solve job-related problems, using handbooks, charts, and tables.
- 02.08 Determine ratios and proportions.
- 02.09 Convert measurements from the English to the metric system and from the metric to the English system.

03.0 IDENTIFY AND USE BASIC HAND TOOLS--The student will be able to:

- 03.01 Use a claw hammer to drive and pull out nails.
- 03.02 Use handsaws to cut boards.
- 03.03 Use screwdrivers to drive in screws.
- 03.04 Drill holes with hand-powered drills.
- 03.05 Identify and use various types of:
  - a. wrenches
  - b. pipe wrenches and plumbing tools
  - c. chisels

d. staple guns
e. wood planes
f. woodworking files
g. spirit levels
h. socket wrench sets
i. hand or block sanders
j. carpenters' squares

04.0 IDENTIFY POWER TOOLS AND DESCRIBE THEIR PROPER OPERATION--The student will be able to:

04.01 Identify power tools, including:
a. sanders
b. drills
c. screwdrivers
d. hand-held saws
e. reciprocating saws
f. radial-arm saws
g. table saws
h. drill presses
i. band saws
j. miter saws
k. planes
l. electric routers

04.02 Describe the proper operation of power tools and equipment.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8720320
Course Title: Building Maintenance and Repair 2
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies necessary to the building maintenance and repair industry. These competencies relate to construction components and building-repair procedures.

05.0 IDENTIFY CONSTRUCTION COMPONENTS--The student will be able to:

- 05.01 Identify the components of various kinds of structures, including:
  - a. interior walls
  - b. exterior walls
  - c. roofs
  - d. flooring systems
- 05.02 Identify the types of wall intersections.
- 05.03 Identify the types and installation procedures of:
  - a. roof sheathing
  - b. wall sheathing
  - c. floor sheathing
- 05.04 Identify various roof supports.

06.0 DESCRIBE REPAIR PROCEDURES FOR EXTERIOR MASONRY, STUCCO, AND CONCRETE SURFACES--The student will be able to:

- 06.01 Identify and select the tools and equipment used for mixing mortar.
- 06.02 Describe the factors that affect the consistency of mortar.
- 06.03 Identify the common ratios (M, N, S, and O) of mortar mixtures.
- 06.04 Identify pointing tools and strike mortar joints.
- 06.05 Repoint old work.
- 06.06 Prepare a work area, protecting adjacent areas.
- 06.07 Apply mortar.
- 06.08 Identify the methods of putting up the line.
- 06.09 Identify the types of trowels.
- 06.10 Identify various types of caulking and application.
- 06.11 Describe procedures for stucco repair.
- 06.12 Mix various types of stucco.
- 06.13 Mix various types of concrete, considering application and pounds per square inch (PSI) strength.
- 06.14 Identify and select concrete tools.
- 06.15 Demonstrate procedures for concrete repair and installation.
- 06.16 Identify and select cleaning materials and equipment.
- 06.17 Demonstrate safe and proper procedures for cleaning equipment, materials, work area, and worker.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8720330
Course Title: Building Maintenance and Repair 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with a more in-depth knowledge of building maintenance and repair. The competencies in this course include communication, computer, basic-science, employability, and public-relations skills.

07.0 APPLY APPROPRIATE COMMUNICATION AND COMPUTER SKILLS--The student will be able to:

- 07.01 Ask and answer questions coherently and concisely.
- 07.02 Read and follow written instructions and listen to and follow oral instructions.
- 07.03 Make oral presentations.
- 07.04 Write reports using a word-processing software.
- 07.05 Read and interpret industry-related materials.
- 07.06 Find information in technical literature such as manufacturer's manuals.
- 07.07 Read and interpret the graphs, charts, diagrams, and tables commonly used in the industry.
- 07.08 Complete the forms and invoices commonly used in the industry.
- 07.09 Demonstrate appropriate telephone communication skills.
- 07.10 Use trade-related computer software.

08.0 DEMONSTRATE AN UNDERSTANDING OF THE APPROPRIATE BASIC SCIENCE--The student will be able to:

- 08.01 Explain molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 08.02 Draw conclusions or make inferences from data.
- 08.03 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and demonstrate a knowledge of the proper precautions required for handling such materials.
- 08.04 Explain pressure measurement in terms of PSI and inches of mercury.
- 08.05 Explain and demonstrate the use of electrical-system testing devices.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 09.01 Conduct a job search and identify advanced-training opportunities.
- 09.02 Secure information about a job.

09.03 Identify the documents, including a resume, that may be required for a job application.
09.04 Complete a job-application form.
09.05 Demonstrate competence in job-interview techniques.
09.06 Demonstrate productive work habits and positive attitudes.
09.07 Demonstrate a knowledge of how to make job changes appropriately.
09.08 Demonstrate ethical practices and responsibilities.
09.09 Demonstrate acceptable personal hygiene and a professional appearance.
09.10 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
09.11 Explain the importance of taking pride in the quality of work performed.
09.12 Describe the importance of a drug-free workplace and industry policies toward drug use.
09.13 Describe the ramifications of a poor driving record on employability opportunities.
09.14 Explain the importance of confidentiality in the workplace.

10.0 DEMONSTRATE POSITIVE PUBLIC-RELATIONS SKILLS--The student will be able to:

10.01 Exercise self-control.
10.02 Identify and demonstrate appropriate responses to criticism.
10.03 Explain the importance of interpersonal skills to success in the industry.
10.04 Demonstrate respect for person and property.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8720340
Course Title: Building Maintenance Technology 4
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop competencies in identifying codes and regulations, applying math skills, and reading contract documents and specifications.

11.0 IDENTIFY LOCAL, STATE, AND FEDERAL CODES AND REGULATIONS--The student will be able to:

- 11.01 Identify and locate local, state, and federal codes, regulations, and standards.
- 11.02 Identify local, state, and federal regulatory agencies.

12.0 APPLY APPROPRIATE MATH SKILLS--The student will be able to:

- 12.01 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
- 12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet, and inches.
- 12.03 Determine the purchase price of materials, including sales tax.
- 12.04 Calculate the following for a specific job:
  - a. work hours
  - b. cost of the workers
  - c. cost to be charged to the client
- 12.05 Explain and compute federal, state, and local taxes.
- 12.06 Calculate the time charged for labor on the job.

13.0 READ CONTRACT DOCUMENTS AND SPECIFICATIONS--The student will be able to:

- 13.01 Explain the purpose and components of contract documents and specifications.
- 13.02 Identify and explain the following elements:
  - a. dimensions
  - b. construction views
  - c. section views
  - d. site plans
  - e. foundation plans
  - f. floor plans and elevations
  - g. details
  - h. wiring details
- 13.03 Explain the relationships of the elements of contract documents.
- 13.04 Identify building symbols.
- 13.05 Identify lists of materials and specifications.
- 13.06 Use architectural and engineering scales.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8720350
Course Title: Building Maintenance Technology 5
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop knowledge and skills in the use of power tools and heavy equipment and in the repair and replacement of interior structures, including doors and windows.

14.0 DESCRIBE THE OPERATIONS OF HEAVY EQUIPMENT AND DEMONSTRATE THE USE OF POWER TOOLS--The student will be able to:

- 14.01 Identify different types and uses of heavy equipment.
- 14.02 Describe the operations of different types of heavy equipment.
- 14.03 Set up, maintain, and demonstrate the use of power tools.

15.0 REPAIR AND REPLACE INTERIOR FLOORS, WALLS, AND CEILINGS--The student will be able to:

- 15.01 Repair a hole in a drywall.
- 15.02 Install paneling.
- 15.03 Install a drywall and finish.
- 15.04 Check and repair wall coverings.
- 15.05 Install interior trim.
- 15.06 Measure the size of a room.
- 15.07 Replace ceramic tile.
- 15.08 Repair carpets.
- 15.09 Repair vinyl composition tile (VCT) and roll flooring.
- 15.10 Check and repair acoustical ceiling systems.
- 15.11 Identify the types of insulation.

16.0 REPAIR AND REPLACE DOORS, WINDOWS, AND SCREENS--The student will be able to:

- 16.01 Install a prehung door and casing.
- 16.02 Install door hardware.
- 16.03 Replace doors.
- 16.04 Check and replace hinges on doors.
- 16.05 Check and replace closet doors.
- 16.06 Remove, measure, and replace door and window lights.
- 16.07 Replace screen on door and window frames.
- 16.08 Check and repair window-glaze seals.
- 16.09 Replace sash locks in windows.
- 16.10 Inspect and replace window operators and locks.
- 16.11 Check, repair, and install panic bars on doors.
- 16.12 Repair a window frame.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8720360
Course Title: Building Maintenance Technology 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the repair and replacement of cabinets, roofs, and plumbing systems.

17.0 REPAIR AND REPLACE CABINETS--The student will be able to:

- 17.01 Identify the parts of a cabinet.
- 17.02 Identify the types of cabinet-door installation.
- 17.03 Identify the types of cabinet hardware.
- 17.04 Install cabinet hardware.
- 17.05 Describe cabinet-installation procedures.
- 17.06 Install cabinet shelving.
- 17.07 Replace or repair surface materials.

18.0 PREPARE AND APPLY FINISHES TO SURFACES--The student will be able to:

- 18.01 Erect an extension ladder and a scaffold.
- 18.02 Prepare the surfaces.
- 18.03 Apply finished coatings to surfaces with a roller, brush, and sprayer.

19.0 REPAIR ROOFS--The student will be able to:

- 19.01 Identify and explain different types of roofing systems and applications.
- 19.02 Check and repair asphalt shingles.
- 19.03 Check and repair roof gutters and downspouts.
- 19.04 Seal pipes and vents on roofs.
- 19.05 Check and repair:
  - a. sheet-metal roofs
  - b. built-up roofs
  - c. roof flashing

20.0 TROUBLESHOOT, REPAIR, AND REPLACE PLUMBING SYSTEMS--The student will be able to:

- 20.01 Troubleshoot, repair, and replace bathroom fixtures and hardware, such as:
  - a. lavatory
  - b. water closet
  - c. urinal
  - d. shower
  - e. bathtub
  - f. traps

g. drain, waste, and vent (DWV) system

20.02 Troubleshoot, repair, and replace kitchen fixtures and hardware, such as sinks, garbage disposals, faucets, and hot-water-heater tanks.

20.03 Identify and explain various pipes and tubing used in the plumbing trade.

20.04 Test and inspect repaired or replaced plumbing systems.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8720370
Course Title: Building Maintenance Technology 7
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with a more in-depth knowledge of building maintenance technology and with competencies in the repair and replacement of electrical, heating, ventilation, and air-cooling (HVAC) systems; ground maintenance; and entrepreneurship.

21.0 TROUBLESHOOT, REPAIR, AND REPLACE ELECTRICAL SYSTEMS--The student will be able to:

- 21.01 Explain basic electrical theory.
- 21.02 Explain branch circuit systems.
- 21.03 Identify and explain ground fault circuit interrupter (GFCI) circuitry.
- 21.04 Troubleshoot electrical systems, using testing and metering devices.
- 21.05 Repair and replace electrical:
  - a. outlets
  - b. switches
  - c. light fixtures
- 21.06 Install and replace breakers and fuses.
- 21.07 Identify types of wiring raceways.
- 21.08 Replace hot-water-heater unit component parts.
- 21.09 Wire a blower motor into an electrical supply.
- 21.10 Test and inspect repaired or replaced electrical systems.
- 21.11 Explain basic motor-control operation.

22.0 MAINTAIN, REPAIR, AND REPLACE HEATING, VENTILATION, AND AIR-COOLING (HVAC) SYSTEMS--The student will be able to:

- 22.01 Explain heating and cooling principles and code requirements.
- 22.02 Describe methods of calculating heating and cooling loads.
- 22.03 Explain the operation and types of the following heating methods: water, steam, forced air, gas, electrical components, and heat pumps.
- 22.04 Troubleshoot and repair a circulation pump, zone valves, burners, pilot lights, and thermocouples in a heating system.
- 22.05 Identify refrigerants.
- 22.06 Determine a refrigerant level.
- 22.07 Describe the proper procedures for descaling air-conditioner units.

22.08 Troubleshoot, repair, and replace air filters, drive belts, and drain systems.
22.09 Troubleshoot, repair, and replace control systems.
22.10 Explain the computer monitoring system associated with heating, ventilation, and air-conditioning (HVAC) control systems and air-quality management.

23.0 PERFORM GROUND MAINTENANCE--The student will be able to:

23.01 Identify common pests.
23.02 Explain basic irrigation theory and design.
23.03 Provide plant, tree, and shrub care.
23.04 Identify ground-maintenance equipment.

24.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

24.01 Define "entrepreneurship."
24.02 Describe the importance of entrepreneurship to the American economy.
24.03 List the advantages and disadvantages of business ownership.
24.04 Identify the risks involved in the ownership of a business.
24.05 Identify the personal characteristics of a successful entrepreneur.
24.06 Identify the business skills needed to operate a small business efficiently and effectively.
24.07 Describe the employer's responsibilities to support the business and industry.

Florida Department of Education
CLUSTER CURRICULUM FRAMEWORK

Cluster Title:	Carpentry And Cabinetmaking
Cluster Type:	Job Preparatory
Occupational Area:	Industrial Education
Components	Two Programs, One Core, Seven Occupational Completion Points

	Secondary	PSAV
Grade Level	9-12, 30, 31	30, 31
Facility Code	203	203
VSO	VICA	VICA
Co-op Method	Yes	Yes
Apprenticeship	Yes	Yes

I. **PURPOSE:** The purpose of the programs in this cluster is to prepare students for employment or advanced training in the carpentry and cabinetmaking industry. The programs in this cluster also provide supplemental training for persons previously or currently employed in the carpentry and cabinetmaking industry.

This cluster of programs focuses on broad, transferable skills, stresses the understanding of all aspects of the carpentry and cabinetmaking industry, and demonstrates elements of the industry such as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

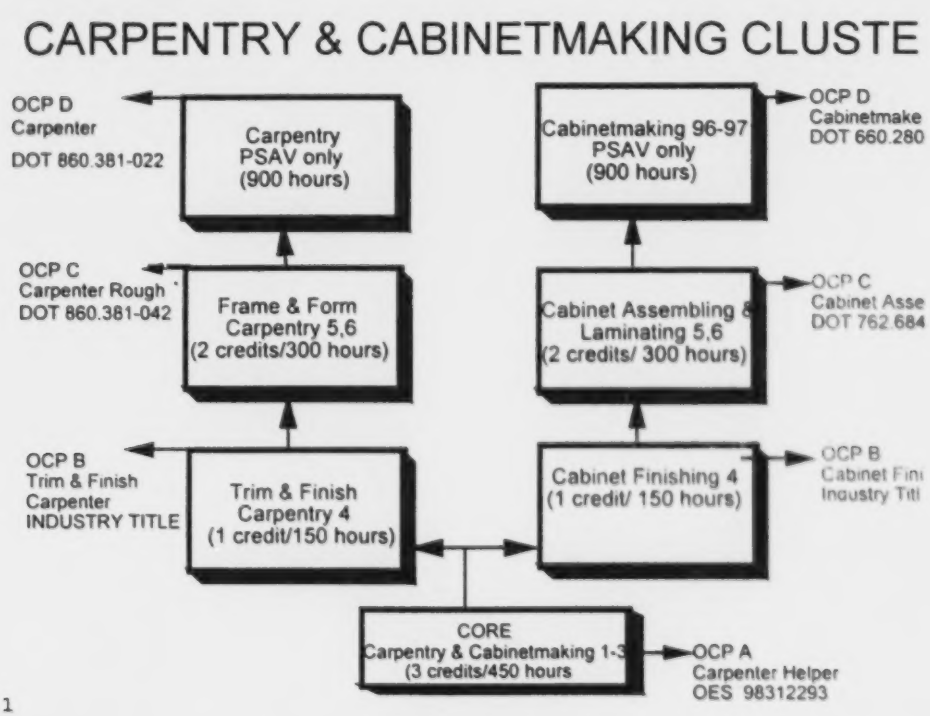
II. **CLUSTER STRUCTURE:** This cluster is a planned sequence of instruction consisting of two programs with one common core and seven occupational completion points. The recommended sequence allows students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training program or terminate as an occupational completer.

It is recommended that students complete the core or demonstrate a mastery of the student performance standards contained in the core before advancing to the course(s) in the next level of either of the programs, Carpentry or Cabinetmaking.

After completing the core, carpentry students may opt to take either the Trim and Finish Carpentry course or the Frame and Form Carpentry course as exit-point goals. However, in order to proceed to Carpentry, students must first complete both the Trim and Finish Carpentry course and the Frame and Form Carpentry course in addition to the core or demonstrate mastery of the performance standards contained in those courses.

Similarly, after completing the core, cabinetmaking students may opt to take either the Cabinet Finishing course or the Cabinet Assembling and Laminating course. Again, however, in order to proceed to Cabinetmaking, students must first complete both the Cabinet Finishing course and the Cabinet Assembling and Laminating course in addition to the core or demonstrate mastery of the student performance standards contained in those courses.

CARPENTRY AND CABINETMAKING CLUSTER



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The following diagram illustrates the Cluster Structure:

At the secondary level, secondary students may only complete 6 courses for the programs in the cluster. The secondary student will also need 900 PSAV hours to complete all the occupational completion points in the programs. The secondary courses which include the core are:

CARPENTRY PROGRAM - 6 secondary credits + 900 PSAV hours

CORE COURSES
8722110 - Carpentry and Cabinetmaking 1
8722120 - Carpentry and Cabinetmaking 2
8722130 - Carpentry and Cabinetmaking 3

COURSES
8722140 - Trim and Finish Carpentry 4
8722150 - Frame and Form Carpentry 5
8722160 - Frame and Form Carpentry 6

CABINETMAKING 96-97 PROGRAM - 6 secondary credits + 900 PSAV hours

CORE COURSES
8722110 - Carpentry and Cabinetmaking 1
8722120 - Carpentry and Cabinetmaking 2
8722130 - Carpentry and Cabinetmaking 3

COURSES
8720140 - Cabinet Finishing 4
8720150 - Cabinet Assembling and Laminating 5
8720160 - Cabinet Assembling and Laminating 6

III. **LABORATORY ACTIVITIES**: Classroom, shop, and laboratory activities are an integral part of this cluster. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation. A generic equipment list for the programs in this cluster is available.

IV. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., (VICA) is the appropriate vocational student organization (VSO) for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The programs in this cluster may be offered in postsecondary adult vocational (PSAV) courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The cooperative method of instruction, on-the-job training (OJT), is appropriate for this program. Whenever the cooperative method is offered, the following are required for each student: (1) a training plan that is signed by the student, teacher, and employer and that includes instructional objectives and a list of on-the-job and in-school learning experiences and (2) a workstation that reflects the equipment, skills, and tasks relevant to the occupation that the student has chosen as a career goal. The student must be paid for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic-skills grade levels required for postsecondary adult vocational students to exit the programs in this cluster are listed before the intended outcomes for each program. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion of the program, remediation should be provided

concurrently in the System for Applied Individualized Learning (SAIL) or a remedial lab. Please refer to the Rule for exemptions.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

When a secondary student with a disability is enrolled in a vocational class for which modifications to the curriculum framework have been made, the particular outcomes and student performance standards that the student must master to earn credit must be specified in the student's Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

SCANS Competencies: To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this cluster must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

July 1997

Florida Department of Education
INTENDED OUTCOMES

Program Title: Carpentry

	Secondary	PSAV
Program Number	**8722100**	**I460202**
CIP Number	0646020105	0646020105
Grade Level	9-12, 30, 31	30, 31
Length	6 Credits + 900 PSAV Hours	1800 Hours
Certification	TEC CONSTR @7 G BLDG CONST @7 G CARPENTRY @7 G CAB WOODWK @7 G	TEC CONSTR @7 G BLDG CONST @7 G CARPENTRY @7 G CAB WOODWK @7 G
Basic Skills		
Math		9
Language		8
Reading		8

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
CARPENTER HELPER - OES 98312293

01.0 Apply shop and occupational safety skills.
02.0 Utilize manual and power tools.
03.0 Describe the importance of the construction industry in the American economy.
04.0 Identify the characteristics of building materials.
05.0 Identify fasteners and hardware.
06.0 Apply appropriate basic-math skills.
07.0 Apply appropriate communication skills.
08.0 Read basic blueprints.
09.0 Demonstrate employability skills.
10.0 Demonstrate positive customer-relations skills.
11.0 Demonstrate an understanding of entrepreneurship.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
TRIM AND FINISH CARPENTER - Industry Title

12.0 Use blueprints and specifications for trim and finish carpentry.
13.0 Install exterior covering and trim.
14.0 Install an interior door (wood and/or metal).
15.0 Lay out and construct an interior-stair system.
16.0 Install an interior wall and ceiling covering.
17.0 Install cabinets and shelving.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
CARPENTER, ROUGH - DOT Code 860.381-042

18.0 Use blueprints and specifications for frame and form carpentry.
19.0 Set up and use a transit and a builder's level.
20.0 Perform site-preparation and layout activities.
21.0 Construct various forms.
22.0 Cut and install framing members for a floor (wood and/or metal).
23.0 Cut and install a wall and partition framing (wood and/or metal).
24.0 Frame a conventional roof (wood).
25.0 Install and brace roof trusses (wood and/or metal).
26.0 Install and dry-in sheathing.
27.0 Set up and install basic rigging and scaffolding.
28.0 Install an exterior door (wood and/or metal).
29.0 Install a window unit (wood and/or metal).
30.0 Lay out and construct an exterior-stair system.

OCCUPATIONAL COMPLETION POINT - DATA CODE D
CARPENTER - DOT Code 860.381-022

31.0 Utilize power tools.
32.0 Construct tilt-up and precast walls.
33.0 Erect shoring.
34.0 Install structural timber.
35.0 Install finished roofing components.
36.0 Demonstrate an understanding of entrepreneurship.
37.0 Demonstrate problem-solving skills.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Carpentry
Secondary Number: 8722100
Postsecondary Number: I460202

OCCUPATIONAL COMPLETION POINT - DATA CODE A
CARPENTER HELPER -OES 98312993

01.0 APPLY SHOP AND OCCUPATIONAL SAFETY SKILLS--The student will be able to:

- 01.01 Maintain a clean, orderly, and safe work area.
- 01.02 Transport, handle, and store materials safely.
- 01.03 Operate a fire extinguisher.
- 01.04 Identify basic first-aid procedures.
- 01.05 Qualify in CPR and apply basic first-aid procedures.
- 01.06 Identify common safety hazards.
- 01.07 Identify and explain the proper use of common personal protective equipment (hard hats, safety glasses, safety shoes, etc.).
- 01.08 Describe "Florida's Right-to-Know" Law, including the Material Safety Data Sheets (MSDS).
- 01.09 Explain the purpose of the Occupational Safety and Health Administration (OSHA).
- 01.10 Identify health-related problems that may result from exposure to hazardous materials.
- 01.11 Describe the proper precautions for handling hazardous materials.
- 01.12 Explain eligibility and the procedures for obtaining worker's compensation.
- 01.13 Explain the importance of complying with ADA requirements for handicapped accessibility.

02.0 UTILIZE MANUAL AND POWER TOOLS--The student will be able to:

- 02.01 Identify various hand and power tools.
- 02.02 Select correct tools for specific jobs.
- 02.03 Clean and care for tools and equipment.
- 02.04 Demonstrate proficiency in the safe use of hand tools and of portable and stationary power tools.
- 02.05 Read and use carpenter's measuring tools.

03.0 DESCRIBE THE IMPORTANCE OF THE CONSTRUCTION INDUSTRY IN THE AMERICAN ECONOMY--The student will be able to:

- 03.01 Describe the role of the construction industry within the free-enterprise system.
- 03.02 Identify career-progression opportunities in the carpentry and cabinetmaking industry.
- 03.03 Describe current issues, topics, and materials in the building-construction industry.

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04.0 IDENTIFY THE CHARACTERISTICS OF BUILDING MATERIALS--The student will be able to:

04.01 Identify the grades and species of lumber.
04.02 Identify the actual and nominal sizes of lumber.
04.03 Identify the grades of plywood and wood products.
04.04 Identify defects and blemishes that affect the durability and strength of lumber.
04.05 Explain the effects of temperature extremes, chemical reaction, and moisture content on building materials.

05.0 IDENTIFY FASTENERS AND HARDWARE--The student will be able to:

05.01 Identify the fasteners commonly used in carpentry and cabinetmaking.
05.02 Identify the hardware commonly used in carpentry and cabinetmaking.
05.03 Identify form-work accessories such as snap-ties, wedges, pigs-feet, whalers, and stiffbacks for forming walls, beams, and columns with plywood and 2'x 4' material.

06.0 APPLY APPROPRIATE BASIC MATH SKILLS--The student will be able to:

06.01 Solve basic math problems related to carpentry and cabinetmaking.
06.02 Interpret and apply metric conversion.
06.03 Solve problems, using board, linear, foot, square-foot, and cubic-foot measurements.
06.04 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
06.05 Measure horizontal and vertical surfaces, using millimeters, centimeters, feet, and inches.
06.06 Determine the correct purchase price of items, including the sales tax.

07.0 APPLY APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

07.01 Write logical and understandable statements.
07.02 Interpret the graphs, charts, diagrams, and tables commonly used in the carpentry or cabinetmaking industry.
07.03 Follow written and oral instructions.
07.04 Ask and answer questions coherently, directly, and concisely.
07.05 Demonstrate appropriate telephone communication skills.

08.0 READ BASIC BLUEPRINTS--The student will be able to:

08.01 Read an architect's scale.
08.02 Identify architectural and engineering elevations, perspectives, and schedules.
08.03 Identify lines and blueprint symbols.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

09.01 Conduct a job search and identify advanced-training opportunities, including apprenticeship programs, if appropriate.
09.02 Obtain information about a job.
09.03 Identify documents that may be required for a job application.
09.04 Complete a job-application form.
09.05 Demonstrate competence in job-interview techniques.
09.06 Demonstrate productive work habits and positive attitudes.
09.07 Demonstrate a knowledge of how to make job changes appropriately.
09.08 Identify ethical and responsible practices.
09.09 Demonstrate acceptable hygiene practices and a professional appearance.
09.10 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
09.11 Explain the importance of taking pride in the quality of work performed.
09.12 Describe the importance of a drug-free workplace and industry policies toward drug and alcohol use.
09.13 Describe the ramifications of a poor driving record on employability opportunities.

10.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

10.01 Exercise self-control.
10.02 Identify and demonstrate appropriate responses to criticism.
10.03 Recognize basic human relations as they relate to success in the industry.
10.04 Respond to customer complaints in a positive, professional manner.
10.05 Demonstrate respect for people and property.

11.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

11.01 Define "entrepreneurship."
11.02 Describe the importance of entrepreneurship to the American economy and the role of small business in the free-enterprise system.
11.03 Debate the advantages and disadvantages of business ownership.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
TRIM AND FINISH CARPENTER - Industry Title

12.0 USE BLUEPRINTS AND SPECIFICATIONS FOR TRIM AND FINISH CARPENTRY--The student will be able to:

12.01 Read an architect's scale for a trim and finish carpentry job.
12.02 Determine dimensions from a blueprint.
12.03 Relate information on blueprints and specifications to real parts, locations, hardware, and fasteners.

13.0 INSTALL EXTERIOR COVERING AND TRIM--The student will be able to:

13.01 Identify the styles of soffit and facia.
13.02 Identify the styles of sidings.
13.03 Install a soffit and facia.
13.04 Install siding and trim.

14.0 INSTALL AN INTERIOR DOOR (WOOD AND/OR METAL)--The student will be able to:

14.01 Identify the types and parts of interior-door systems.
14.02 Install an interior-door jamb and hang a door.
14.03 Identify and install interior-door hardware.

15.0 LAY OUT AND CONSTRUCT AN INTERIOR STAIR SYSTEM--The student will be able to:

15.01 Identify the types and styles of interior stair systems.
15.02 Identify the components of an interior-stair system.
15.03 Calculate the number of risers and treads for an interior-stair system.
15.04 Lay out, cut, and assemble an interior-stair system (rough and finish).

16.0 INSTALL AN INTERIOR WALL AND CEILING COVERING--The student will be able to:

16.01 Install furring strips.
16.02 Install drywall.
16.03 Identify and install paneling and trim.
16.04 Identify and install ceiling materials and systems.

17.0 INSTALL CABINETS AND SHELVING--The student will be able to:

17.01 Identify the types and parts of cabinets.
17.02 Identify the types of cabinet doors.
17.03 Identify the types of cabinet hardware.
17.04 Install cabinet hardware.
17.05 Install a custom-built cabinet.
17.06 Install shelving.
17.07 Construct and laminate a countertop.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
Carpenter Rough 860.381-042

18.0 USE BLUEPRINTS AND SPECIFICATIONS FOR FRAME AND FORM CARPENTRY--The student will be able to:

18.01 Read an architect's scale for a frame and form carpentry job.
18.02 Determine dimensions from a blueprint.
18.03 Relate information on blueprints and specifications to real parts, locations, hardware, and fasteners.

19.0 SET UP AND USE A TRANSIT AND A BUILDER'S LEVEL--The student will be able to:

19.01 Set up and adjust a transit and a builder's level over a point and establish lines over two points.
19.02 Read a measuring rod.
19.03 Perform differential leveling.

20.0 PERFORM SITE-PREPARATION AND LAYOUT ACTIVITIES--The student will be able to:

20.01 Identify building layout, using math skills.
20.02 Erect batter boards and locate building lines.
20.03 Locate building line points on batter boards, using a builder's level.
20.04 Locate building lines on a plot plan.
20.05 Square a building, using the 3-4-5 triangle method and the diagonal method.

21.0 CONSTRUCT VARIOUS FORMS--The student will be able to:

21.01 Identify styles of footings.
21.02 Construct and set a pier footing form.
21.03 Strip a form for reuse.
21.04 Construct edge forms for a floor with or without foundation walls and for a stoop.
21.05 Construct various types of curb and gutter forms.
21.06 Form various types of beams, columns, and slabs with various form systems (Burke, Symons, plywood, and 2'x 4').
21.07 Identify and explain the different types and uses of flying forms for decks and shear walls.
21.08 Demonstrate a knowledge of concrete pressure and its implications for form-work routines.

22.0 CUT AND INSTALL FRAMING MEMBERS FOR A FLOOR (WOOD AND/OR METAL)--The student will be able to:

22.01 Identify and describe floor-framing members, including subfloor.
22.02 Lay out, cut, and install supports for structures (e.g., sills, columns, beams, and girders).
22.03 Lay out and install various types of joists and openings, including joists for a cantilevered floor.
22.04 Install various types of bridgings.
22.05 Install various types of subfloors, applying fastening techniques.

23.0 CUT AND INSTALL A WALL AND PARTITION FRAMING (WOOD AND/OR METAL)--The student will be able to:

23.01 Identify framing members used in wall and partition construction.
23.02 Lay out wall lines and partition locations on a floor.
23.03 Lay out walls for studs, doors, and windows.
23.04 Cut studs, trimmers, cripples, headers, and firestops to length.
23.05 Build T's, corners, and headers.

23.06 Lay out and assemble wall sections.
23.07 Install wall sheathing and/or diagonal bracing.
23.08 Install insulation material and a vapor barrier.

24.0 FRAME A CONVENTIONAL ROOF (WOOD)--The student will be able to:

24.01 Identify roof members, styles, and framing units.
24.02 Compute the length of common, hip, and jack rafters.
24.03 Lay out rafter and ceiling joist locations on plate and ridge on center.
24.04 Select and install nails and fasteners according to specifications.
24.05 Lay out, cut, and erect rafters.
24.06 Install roof sheathing.

25.0 INSTALL AND BRACE ROOF TRUSSES (WOOD AND/OR METAL)--The student will be able to:

25.01 Identify the main parts of roof trusses.
25.02 Identify the hardware used in roof truss construction.
25.03 Describe the advantages of roof trusses.
25.04 Describe the installation and bracing (temporary and permanent) of roof trusses.
25.05 Install roof trusses, using temporary and permanent bracing.

26.0 INSTALL AND DRY-IN SHEATHING--The student will be able to:

26.01 Install sheathing.
26.02 Select and install nails and fasteners according to the specifications.
26.03 Dry-in a roof.

27.0 SET UP AND INSTALL BASIC RIGGING AND SCAFFOLDING--The student will be able to:

27.01 Identify and explain rigging equipment.
27.02 Inspect rigging equipment, following safety precautions.
27.03 Estimate size, weight, and center of gravity.
27.04 Tie knots.
27.05 Identify and explain types of cranes.
27.06 Rig and move materials and equipment, following safety precautions.
27.07 Set up and install scaffolds, following safety precautions.
27.08 Inspect various types of ladders and scaffolds, following safety precautions.

28.0 INSTALL AN EXTERIOR DOOR (WOOD AND/OR METAL)--The student will be able to:

28.01 Identify the parts of exterior door systems.
28.02 Install exterior-door jambs and hang door.
28.03 Install exterior door hardware.

29.0 INSTALL A WINDOW UNIT (WOOD AND/OR METAL)--The student will be able to:

29.01 Identify the types of windows.
29.02 Identify the parts of a window unit.
29.03 Install a window unit.

30.0 LAY OUT AND CONSTRUCT AN EXTERIOR STAIR SYSTEM--The student will be able to:

30.01 Identify types of exterior stair systems.
30.02 Identify parts of an exterior stair system.
30.03 Calculate the number of treads and risers for an exterior stair system.
30.04 Lay out, cut, and assemble an exterior stair system.

OCCUPATIONAL COMPLETION POINT - DATA CODE D
CARPENTER - DOT Code 860.381-022

31.0 UTILIZE POWER TOOLS--The student will be able to:

31.01 Operate both portable and stationary power tools, observing safety precautions.
31.02 Select the correct power tools required for specific jobs.
31.03 Maintain power tools according to the manufacturer's recommendations.

32.0 CONSTRUCT TILT-UP AND PRECAST WALLS--The student will be able to:

32.01 Brace and erect tilt-up panels.
32.02 Erect and install precast wall panels, using rolling metal forms.
32.03 Set precast beams.
32.04 Install precast parapet wall sections.

33.0 ERECT SHORING--The student will be able to:

33.01 Erect patented-design shoring.
33.02 Construct and erect conventional shoring.
33.03 Erect safety and shoring for excavation.
33.04 Erect a deck, using span-all metal shoring.

34.0 INSTALL STRUCTURAL TIMBER--The student will be able to:

34.01 Identify structural-timber components.
34.02 Install heavy structural timber.

35.0 INSTALL FINISHED ROOFING COMPONENTS--The student will be able to:

35.01 Install composition shingles in a valley.
35.02 Install roof-flashing components and accessories.
35.03 Install ridge vent.
35.04 Frame, sheath, and flash a cricket.

36.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

36.01 Discuss the risks involved in the ownership of a business.
36.02 Identify the necessary personal characteristics of a successful entrepreneur.
36.03 Identify the business skills needed to operate a small business efficiently and effectively.

37.0 DEMONSTRATE PROBLEM-SOLVING SKILLS--The student will be able to:

37.01 Organize and plan multiple tasks, utilizing various resources such as time, personnel, and materials.
37.02 Analyze problems, identify the causes, and devise plans of action.
37.03 Identify obstacles, generate alternatives, and choose the best alternatives.
37.04 Create new and better ways to perform tasks, applying the latest ideas to putting work in place.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722110
Course Title: Carpentry and Cabinetmaking 1
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to the carpentry and cabinetmaking industry. These competencies relate to safety practices, tool- and equipment utilization, identification of building materials, fasteners and hardware, basic math, communication, and blueprint reading.

01.0 APPLY SHOP AND OCCUPATIONAL SAFETY SKILLS--The student will be able to:

- 01.01 Maintain a clean, orderly, and safe work area.
- 01.02 Transport, handle, and store materials safely.
- 01.03 Operate a fire extinguisher.
- 01.04 Identify basic first-aid procedures.
- 01.05 Identify common safety hazards.
- 01.06 Explain the purpose of the Occupational Safety and Health Administration (OSHA).

02.0 UTILIZE MANUAL AND POWER TOOLS--The student will be able to:

- 02.01 Identify various hand and power tools.
- 02.02 Select correct tools for specific jobs.
- 02.03 Clean and care for tools and equipment.
- 02.04 Read and use carpenter's measuring tools.

04.0 IDENTIFY THE CHARACTERISTICS OF BUILDING MATERIALS--The student will be able to:

- 04.01 Identify the grades and species of lumber.
- 04.02 Identify the actual and nominal sizes of lumber.
- 04.03 Identify the grades of plywood and wood products.
- 04.04 Identify defects and blemishes that affect the durability and strength of lumber.
- 04.05 Explain the effects of temperature extremes, chemical reaction, and moisture content on building materials.

05.0 IDENTIFY FASTENERS AND HARDWARE--The student will be able to:

- 05.01 Identify the fasteners commonly used in carpentry and cabinetmaking.
- 05.02 Identify the hardware commonly used in carpentry and cabinetmaking.

06.0 APPLY APPROPRIATE BASIC-MATH SKILLS--The student will be able to:

06.01 Solve basic-math problems related to carpentry and cabinetmaking.
06.02 Interpret and apply metric conversion.

07.0 APPLY APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

07.01 Write logical and understandable statements.
07.02 Follow written and oral instructions.
07.03 Ask and answer questions coherently, directly, and concisely.
07.04 Demonstrate appropriate telephone communication skills.

08.0 READ BASIC BLUEPRINTS--The student will be able to:

08.01 Read an architect's scale.
08.02 Identify lines and blueprint symbols.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722120
Course Title: Carpentry and Cabinetmaking 2
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop in-depth knowledge and skills related to safety, manual and power tools, the construction industry in America, math applications, communication, and blueprint reading.

01.0 APPLY SHOP AND OCCUPATIONAL SAFETY SKILLS--The student will be able to:

- 01.07 Qualify in CPR and apply basic first-aid procedures.
- 01.08 Identify and explain the proper use of common personal protective equipment (hard hats, safety glasses, safety shoes, etc.).
- 01.09 Identify health-related problems that may result from exposure to hazardous materials.
- 01.10 Describe the proper precautions for handling hazardous materials.

02.0 UTILIZE MANUAL AND POWER TOOLS--The student will be able to:

- 02.05 Demonstrate proficiency in the safe use of hand tools and of portable and stationary power tools.

03.0 DESCRIBE THE IMPORTANCE OF THE CONSTRUCTION INDUSTRY IN THE AMERICAN ECONOMY--The student will be able to:

- 03.01 Describe the role of the construction industry within the free-enterprise system.
- 03.02 Identify career-progression opportunities in the carpentry and cabinetmaking industry.
- 03.03 Describe current issues, topics, and materials in the building-construction industry.

06.0 APPLY APPROPRIATE BASIC-MATH SKILLS--The student will be able to:

- 06.03 Solve problems, using board, linear, foot, square-foot, and cubic-foot measurements.
- 06.04 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
- 06.05 Measure horizontal and vertical surfaces using millimeters, centimeters, feet, and inches.
- 06.06 Determine the correct purchase price of items, including the sales tax.

07.0 APPLY APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

07.05 Interpret the graphs, charts, diagrams, and tables commonly used in the carpentry or cabinetmaking industry.

08.0 READ BASIC BLUEPRINTS--The student will be able to:

08.03 Identify architectural and engineering elevations, perspectives, and schedules.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722130
Course Title: Carpentry and Cabinetmaking 3
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to the carpentry and cabinetmaking industry. These competencies relate to safety, fasteners and hardware, employability skills, customer relations, and entrepreneurship.

01.0 APPLY SHOP AND OCCUPATIONAL SAFETY SKILLS--The student will be able to:

- 01.11 Describe "Florida's Right-to-Know" Law, including the Material Safety Data Sheets (MSDS).
- 01.12 Explain eligibility and the procedures for obtaining worker's compensation.
- 01.13 Explain the importance of complying with ADA requirements for handicapped accessibility.

05.0 IDENTIFY FASTENERS AND HARDWARE--The student will be able to:

- 05.03 Identify form-work accessories such as snap-ties, wedges, pigs-feet, whalers, and stiffbacks for forming walls, beams, and columns with plywood and 2'x 4' material.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 09.01 Conduct a job search and identify advanced-training opportunities, including apprenticeship programs, if appropriate.
- 09.02 Obtain information about a job.
- 09.03 Identify documents that may be required for a job application.
- 09.04 Complete a job-application form.
- 09.05 Demonstrate competence in job-interview techniques.
- 09.06 Demonstrate productive work habits and positive attitudes.
- 09.07 Demonstrate a knowledge of how to make job changes appropriately.
- 09.08 Identify ethical and responsible practices.
- 09.09 Demonstrate acceptable hygiene practices and a professional appearance.
- 09.10 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
- 09.11 Explain the importance of taking pride in the quality of work performed.
- 09.12 Describe the importance of a drug-free workplace and industry policies toward drug and alcohol use.
- 09.13 Describe the ramifications of a poor driving record on employability opportunities.

10.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

- 10.01 Exercise self-control.
- 10.02 Identify and demonstrate appropriate responses to criticism.
- 10.03 Recognize basic human relations as they relate to success in the industry.
- 10.04 Respond to customer complaints in a positive, professional manner.
- 10.05 Demonstrate respect for people and property.

11.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 11.01 Define "entrepreneurship."
- 11.02 Describe the importance of entrepreneurship to the American economy and the role of small business in the free-enterprise system.
- 11.03 Debate the advantages and disadvantages of business ownership.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722140
Course Title: Trim and Finish Carpentry 4
Course Credit: 1

COURSE DESCRIPTION:

This course provides students with an in-depth knowledge of trim and finish carpentry. It trains students to use blueprints and specifications and to install an exterior covering and trim, interior doors, interior-stair systems, interior walls, ceiling coverings, and cabinets and shelving.

12.0 USE BLUEPRINTS AND SPECIFICATIONS FOR TRIM AND FINISH CARPENTRY--The student will be able to:

- 12.01 Read an architect's scale for a trim and finish carpentry job.
- 12.02 Determine dimensions from a blueprint.
- 12.03 Relate information on blueprints and specifications to real parts, locations, hardware, and fasteners.

13.0 INSTALL EXTERIOR COVERING AND TRIM--The student will be able to:

- 13.01 Identify the styles of soffit and facia.
- 13.02 Identify the styles of sidings.
- 13.03 Install a soffit and facia.
- 13.04 Install siding and trim.

14.0 INSTALL AN INTERIOR DOOR (WOOD AND/OR METAL)--The student will be able to:

- 14.01 Identify the types and parts of interior-door systems.
- 14.02 Install an interior-door jamb and hang a door.
- 14.03 Identify and install interior-door hardware.

15.0 LAY OUT AND CONSTRUCT AN INTERIOR-STAIR SYSTEM--The student will be able to:

- 15.01 Identify the types and styles of interior-stair systems.
- 15.02 Identify the components of an interior-stair system.
- 15.03 Calculate the number of risers and treads for an interior-stair system.
- 15.04 Lay out, cut, and assemble an interior-stair system (rough and finish).

16.0 INSTALL AN INTERIOR WALL AND CEILING COVERING--The student will be able to:

- 16.01 Install furring strips.
- 16.02 Install drywall.

16.03 Identify and install paneling and trim.
16.04 Identify and install ceiling materials and systems.

17.0 INSTALL CABINETS AND SHELVING--The student will be able to:

17.01 Identify the types and parts of cabinets.
17.02 Identify the types of cabinet doors.
17.03 Identify the types of cabinet hardware.
17.04 Install cabinet hardware.
17.05 Install a custom-built cabinet.
17.06 Install shelving.
17.07 Construct and laminate a countertop.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722150
Course Title: Frame and Form Carpentry 5
Course Credit: 1

COURSE DESCRIPTION:

This course provides students with the knowledge and skills needed for frame and form carpentry. The content relates to blueprints and specifications; site preparation; framing members, walls, and partition framing; roof framing; roof trusses; and sheathing.

18.0 USE BLUEPRINTS AND SPECIFICATIONS FOR FRAME AND FORM CARPENTRY--The student will be able to:

- 18.01 Read an architect's scale for a frame and form carpentry job.
- 18.02 Determine dimensions from a blueprint.
- 18.03 Relate information on blueprints and specifications to real parts, locations, hardware, and fasteners.

20.0 PERFORM SITE-PREPARATION AND LAYOUT ACTIVITIES--The student will be able to:

- 20.01 Identify building layout, using math skills.
- 20.02 Erect batter boards and locate building lines.
- 20.03 Locate building line points on batter boards, using a builder's level.
- 20.04 Locate building lines on a plot plan.
- 20.05 Square a building, using the 3-4-5 triangle method and the diagonal method.

22.0 CUT AND INSTALL FRAMING MEMBERS FOR A FLOOR (WOOD AND/OR METAL)--The student will be able to:

- 22.01 Identify and describe floor-framing members, including subfloor.
- 22.02 Lay out, cut, and install supports for structures (e.g., sills, columns, beams, and girders).
- 22.03 Lay out and install various types of joists and openings, including joists for a cantilevered floor.
- 22.04 Install various types of bridgings.
- 22.05 Install various types of subfloors, applying fastening techniques.

23.0 CUT AND INSTALL A WALL AND PARTITION FRAMING (WOOD AND/OR METAL)--The student will be able to:

- 23.01 Identify framing members used in wall and partition construction.
- 23.02 Lay out wall lines and partition locations on a floor.

23.03 Lay out walls for studs, doors, and windows.
23.04 Cut studs, trimmers, cripples, headers, and firestops to length.
23.05 Build T's, corners, and headers.
23.06 Lay out and assemble wall sections.
23.07 Install wall sheathing and/or diagonal bracing.
23.08 Install insulation material and a vapor barrier.

24.0 FRAME A CONVENTIONAL ROOF (WOOD)--The student will be able to:

24.01 Identify roof members, styles, and framing units.
24.02 Compute the length of common, hip, and jack rafters.
24.03 Lay out rafter and ceiling joist locations on plate and ridge on center.
24.04 Select and install nails and fasteners according to specifications.
24.05 Lay out, cut, and erect rafters.
24.06 Install roof sheathing.

25.0 INSTALL AND BRACE ROOF TRUSSES (WOOD AND/OR METAL)--The student will be able to:

25.01 Identify the main parts of roof trusses.
25.02 Identify the hardware used in roof truss construction.
25.03 Describe the advantages of roof trusses.
25.04 Describe the installation and bracing (temporary and permanent) of roof trusses.
25.05 Install roof trusses, using temporary and permanent bracing.

26.0 INSTALL AND DRY-IN SHEATHING--The student will be able to:

26.01 Install sheathing.
26.02 Select and install nails and fasteners according to the specifications.
26.03 Dry-in a roof.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722160
Course Title: Frame and Form Carpentry 6
Course Credit: 1

COURSE DESCRIPTION:

This course provides students with the in-depth knowledge and skills needed for frame and form carpentry. The content deals with the use of a transit and a builder's level; the construction of forms; and the installation of rigging and scaffolding, exterior doors and stairs, and window units.

19.0 SET UP AND USE A TRANSIT AND A BUILDER'S LEVEL--The student will be able to:

- 19.01 Set up and adjust a transit and a builder's level over a point and establish lines over two points.
- 19.02 Read a measuring rod.
- 19.03 Perform differential leveling.

21.0 CONSTRUCT VARIOUS FORMS--The student will be able to:

- 21.01 Identify styles of footings.
- 21.02 Construct and set a pier footing form.
- 21.03 Strip a form for reuse.
- 21.04 Construct edge forms for a floor with or without foundation walls and for a stoop.
- 21.05 Construct various types of curb and gutter forms.
- 21.06 Form various types of beams, columns, and slabs with various form systems (Burke, Symons, plywood, and 2'x 4').
- 21.07 Identify and explain the different types and uses of flying forms for decks and shear walls.
- 21.08 Demonstrate a knowledge of concrete pressure and its implications for form-work routines.

27.0 SET UP AND INSTALL BASIC RIGGING AND SCAFFOLDING--The student will be able to:

- 27.01 Identify and explain rigging equipment.
- 27.02 Inspect rigging equipment, following safety precautions.
- 27.03 Estimate size, weight, and center of gravity.
- 27.04 Tie knots.
- 27.05 Identify and explain types of cranes.
- 27.06 Rig and move materials and equipment, following safety precautions.
- 27.07 Set up and install scaffolds, following safety precautions.
- 27.08 Inspect various types of ladders and scaffolds, following safety precautions.

28.0 INSTALL AN EXTERIOR DOOR (WOOD AND/OR METAL)--The student will be able to:

28.01 Identify the parts of exterior door systems.
28.02 Install exterior-door jambs and hang door.
28.03 Install exterior-door hardware.

29.0 INSTALL A WINDOW UNIT (WOOD AND/OR METAL)--The student will be able to:

29.01 Identify the types of windows.
29.02 Identify the parts of a window unit.
29.03 Install a window unit.

30.0 LAY OUT AND CONSTRUCT AN EXTERIOR STAIR SYSTEM--The student will be able to:

30.01 Identify the types of exterior stair systems.
30.02 Identify the parts of an exterior stair system.
30.03 Calculate the number of treads and risers for an exterior stair system.
30.04 Lay out, cut, and assemble an exterior stair system.

July 1997

Florida Department of Education
INTENDED OUTCOMES

Program Title: **Cabinetmaking 96-97**

	Secondary	PSAV
Program Number	**8720100**	**I480704**
CIP Number	0648070302	0648070302
Grade Level	9-12, 30, 31	30, 31
Length	6 Credits + 900 PSAV Hours	1800 Hours
Certification	CAB WOODWK @7 G CARPENTRY @7 G BLDG CONST @7 G TEC CONSTR @7 G	CAB WOODWK @7 G CARPENTRY @7 G BLDG CONST @7 G TEC CONSTR @7 G
Basic Skills		
Math		9
Language		8
Reading		8

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
CARPENTER HELPER - OES Code 98312993

01.0 Apply shop and occupational safety skills.
02.0 Utilize manual and power tools.
03.0 Describe the importance of the construction industry in the American economy.
04.0 Identify the characteristics of building materials.

05.0 Identify fasteners and hardware.
06.0 Apply appropriate basic-math skills.
07.0 Apply appropriate communication skills.
08.0 Read basic blueprints.
09.0 Demonstrate employability skills.
10.0 Demonstrate positive customer-relations skills.
11.0 Demonstrate an understanding of entrepreneurship.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
CABINET FINISHER -Industry Title

12.0 Prepare cabinets for finish.
13.0 Apply finishes.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
CABINET ASSEMBLER - DOT Code 762.684-014

14.0 Fasten stock and joints.
15.0 Assemble cabinet components.
16.0 Install cabinets.
17.0 Apply laminates.

OCCUPATIONAL COMPLETION POINT - DATA CODE D
CABINETMAKER - DOT Code 660.280-010

18.0 Plan, design, and lay out casework.
19.0 Utilize power tools.
20.0 Construct joints.
21.0 Cut casework components.
22.0 Assemble casework components.
23.0 Construct cabinet drawers.
24.0 Construct cabinet doors.
25.0 Construct curved pieces.
26.0 Perform millwork operations.
27.0 Demonstrate an understanding of entrepreneurship.
28.0 Demonstrate problem-solving skills.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Cabinetmaking 96-97
Secondary Number: 8720100
Postsecondary Number: I480704

OCCUPATIONAL COMPLETION POINT - DATA CODE A
CARPENTER HELPER - OES 95312293

01.0 APPLY SHOP AND OCCUPATIONAL SAFETY SKILLS--The student will be able to:

- 01.01 Maintain a clean, orderly, and safe work area.
- 01.02 Transport, handle, and store materials safely.
- 01.03 Operate a fire extinguisher.
- 01.04 Identify basic first-aid procedures.
- 01.05 Qualify in CPR and apply basic first-aid procedures.
- 01.06 Identify common safety hazards.
- 01.07 Identify and explain the proper use of common personal protective equipment (hard hats, safety glasses, safety shoes, etc.).
- 01.08 Describe Florida's "Right-to-Know" Law, including the Material Safety Data Sheets (MSDS).
- 01.09 Explain the purpose of the Occupational Safety and Health Administration (OSHA).
- 01.10 Identify health-related problems that may result from exposure to hazardous materials.
- 01.11 Describe the proper precautions for handling hazardous materials.
- 01.12 Explain eligibility and the procedures for obtaining worker's compensation.
- 01.13 Explain the importance of complying with ADA requirements for handicapped accessibility.

02.0 UTILIZE MANUAL AND POWER TOOLS--The student will be able to:

- 02.01 Identify various hand and power tools.
- 02.02 Select correct tools for specific jobs.
- 02.03 Clean and care for tools and equipment.
- 02.04 Demonstrate proficiency in the safe use of hand tools and of portable and stationary power tools.
- 02.05 Read and use carpenter's measuring tools.

03.0 DESCRIBE THE IMPORTANCE OF THE CONSTRUCTION INDUSTRY IN THE AMERICAN ECONOMY--The student will be able to:

- 03.01 Describe the role of the construction industry within the free-enterprise system.
- 03.02 Identify career-progression opportunities in the carpentry and cabinetmaking industry.
- 03.03 Describe current issues, topics, and materials in the building-construction industry.

04.0 IDENTIFY THE CHARACTERISTICS OF BUILDING MATERIALS--The student will be able to:

- 04.01 Identify the grades and species of lumber.
- 04.02 Identify the actual and nominal sizes of lumber.
- 04.03 Identify the grades of plywood and wood products.
- 04.04 Identify defects and blemishes that affect the durability and strength of lumber.
- 04.05 Explain the effects of temperature extremes, chemical reaction, and moisture content on building materials.

05.0 IDENTIFY FASTENERS AND HARDWARE--The student will be able to:

- 05.01 Identify the fasteners commonly used in carpentry and cabinetmaking.
- 05.02 Identify the hardware commonly used in carpentry and cabinetmaking.
- 05.03 Identify form-work accessories such as snap-ties, wedges, pigs-feet, whalers, and stiffbacks for forming walls, beams, and columns with plywood, and 2'x 4' material.

06.0 APPLY APPROPRIATE BASIC-MATH SKILLS--The student will be able to:

- 06.01 Solve basic-math problems related to carpentry and cabinetmaking.
- 06.02 Interpret and apply metric conversion.
- 06.03 Solve problems, using board, linear, foot, square-foot, and cubic-foot measurements.
- 06.04 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
- 06.05 Measure horizontal and vertical surfaces, using millimeters, centimeters, feet, and inches.
- 06.06 Determine the correct purchase price of items, including the sales tax.

07.0 APPLY APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 07.01 Write logical and understandable statements.
- 07.02 Interpret the graphs, charts, diagrams, and tables commonly used in the carpentry or cabinetmaking industry.
- 07.03 Follow written and oral instructions.
- 07.04 Ask and answer questions coherently, directly, and concisely.
- 07.05 Demonstrate appropriate telephone communication skills.

08.0 READ BASIC BLUEPRINTS--The student will be able to:

- 08.01 Read an architect's scale.
- 08.02 Identify architectural and engineering elevations, perspectives, and schedules.
- 08.03 Identify lines and blueprint symbols.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

09.01 Conduct a job search and identify advanced-training opportunities, including apprenticeship programs, if appropriate.
09.02 Obtain information about a job.
09.03 Identify documents that may be required for a job application.
09.04 Complete a job-application form.
09.05 Demonstrate competence in job-interview techniques.
09.06 Demonstrate productive work habits and positive attitudes.
09.07 Demonstrate a knowledge of how to make job changes appropriately.
09.08 Identify ethical and responsible practices.
09.09 Demonstrate acceptable hygiene practices and a professional appearance.
09.10 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
09.11 Explain the importance of taking pride in the quality of work performed.
09.12 Describe the importance of a drug-free workplace and industry policies toward drug and alcohol use.
09.13 Describe the ramifications of a poor driving record on employability opportunities.

10.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

10.01 Exercise self-control.
10.02 Identify and demonstrate appropriate responses to criticism.
10.03 Recognize basic human relations as they relate to success in the industry.
10.04 Respond to customer complaints in a positive, professional manner.
10.05 Demonstrate respect for people and property.

11.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

11.01 Define "entrepreneurship."
11.02 Describe the importance of entrepreneurship to the American economy and the role of small business in the free-enterprise system.
11.03 Debate the advantages and disadvantages of business ownership.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
CABINET FINISHER - Industry Title

12.0 PREPARE CABINETS FOR FINISH--The student will be able to:

12.01 Fill nail and screw holes.
12.02 Install wood plugs in prepared holes.
12.03 Sand a cabinet and joints for finish.
12.04 Select and apply proper filler.
12.05 Sand wood surfaces for finishing.

12.06 Stain, bleach, fill, and seal wood surfaces, as needed.

13.0 APPLY FINISHES--The student will be able to:

13.01 Apply various types of finishes, including:
- a. lacquer-based
- b. water-based
- c. oil-based
- d. enamel
- e. polyurethane

13.02 Apply the types of finishes that the local market demands.

13.03 Observe safety precautions when applying finishes, including wearing respirator and protective clothing approved by National Institute of Occupational Safety and Health (NIOSH).

OCCUPATIONAL COMPLETION POINT - DATA CODE C

CABINET ASSEMBLER - DOT Code 762.684-014

14.0 FASTEN STOCK AND JOINTS--The student will be able to:

14.01 Identify types of glues and fasteners and describe their applications.

14.02 Fasten stock with glue and clamps.

14.03 Fasten stock and joints with appropriate fasteners, such as:
- a. nails
- b. staples
- c. screws
- d. bolts

14.04 Fill and finish nail and screw holes with fillers and plugs.

14.05 Glue and clamp stock, using various techniques.

15.0 ASSEMBLE CABINET COMPONENTS--The student will be able to:

15.01 Install hardware, such as hinges, catches, pulls, knobs, and guides, on assembled cabinets.

15.02 Install fasteners.

15.03 Install drawers.

15.04 Install various types of doors, including:
- a. overlay
- b. lipped
- c. flush

15.05 Install adjustable shelving.

15.06 Install glass panels and metal grills.

15.07 Install specialty hardware, such as a lazy Susan, wire racks, and "pull-outs."

15.08 Install sliding doors and track.

16.0 INSTALL CABINETS--The student will be able to:

16.01 Load and secure casework for hauling.

16.02 Check walls and floors for level and plumb.

16.03 Determine fasteners for block or walls.

16.04 Install upper and lower cabinets and other casework.

16.05 Fasten a suspended cabinet unit to ceiling.

16.06 Install countertops, including sink cutouts and back splash.
16.07 Cut and install molding and trim.
16.08 Adjust doors and drawers.
16.09 Clean work site.

17.0 APPLY LAMINATES--The student will be able to:

17.01 Lay out and cut core stock to specifications.
17.02 Lay out and cut laminate to specification.
17.03 Apply adhesive.
17.04 Apply laminate to core stock.
17.05 Trim and file plastic laminate edges.
17.06 Clean laminated surfaces.
17.07 Laminate a curved surface.
17.08 Repair laminate defects.

OCCUPATIONAL COMPLETION POINT - DATA CODE D
CABINETMAKER - DOT Code 660.280-010

18.0 PLAN, DESIGN, AND LAY OUT CASEWORK--The student will be able to:

18.01 Convert measurements from the English to the metric system and from the metric to the English system.
18.02 Interpret blueprints and explain common abbreviations used on drawings.
18.03 Draw a set of plans to scale.
18.04 Make a layout on the rod.
18.05 Develop a plan or procedure and a cut list for a specific job.
18.06 Estimate the materials required for the job.
18.07 Estimate labor and materials cost, using computer-application programs, if available.
18.08 Select and match wood stock for compatibility of grain and color.
18.09 Design and lay out cabinets, using a computer-assisted design (CAD) program, if available.

19.0 UTILIZE POWER TOOLS--The student will be able to:

19.01 Operate both portable and stationary power tools, observing safety precautions.
19.02 Select the correct power tools required for specific jobs.
19.03 Maintain power tools according to the manufacturer's specifications.

20.0 CONSTRUCT JOINTS--The student will be able to:

20.01 Construct various types of joints, including:
a. butt
b. dado
c. rabbeted
d. lap
e. miter
f. splined
g. tongue-and-groove

h. mortise-and-tenon

20.02 Install dowels in common wood joints.

20.03 Install biscuit spline in common wood joints.

21.0 CUT CASEWORK COMPONENTS--The student will be able to:

21.01 Cut frame stiles and rails.

21.02 Cut end, top, and bottom panels.

21.03 Cut partitions and sleepers.

21.04 Cut shelf panels.

21.05 Cut skeleton frame stiles and rails.

21.06 Cut a toe board and a back panel.

21.07 Cut a casework top or countertop and a back splash.

21.08 Cut drawer front, sides, back, and bottom.

21.09 Cut wood drawer guides.

21.10 Cut doors, such as:

a. solid

b. flexible

c. paneled

21.11 Rout or shape casework components.

22.0 ASSEMBLE CASEWORK COMPONENTS--The student will be able to:

22.01 Assemble face frame, panels, toe boards, and skeleton frame.

22.02 Fasten a top or countertop and a back splash to casework.

22.03 Assemble drawers.

22.04 Assemble flexible and paneled doors.

22.05 Install shelving.

22.06 Attach trim, molding, and edge banding.

23.0 CONSTRUCT CABINET DRAWERS--The student will be able to:

23.01 Make various types of drawers, including:

a. overlay

b. lipped

c. flush

23.02 Construct drawer guides.

24.0 CONSTRUCT CABINET DOORS--The student will be able to:

24.01 Make solid and tambour doors.

24.02 Make a frame and panel door.

24.03 Cut and set glass in a frame.

24.04 Band edges of solid doors.

24.05 Construct wood-door tracks.

25.0 CONSTRUCT CURVED PIECES--The student will be able to:

25.01 Cut a curved piece from solid stock.

25.02 Make a curved piece by saw kerfing.

25.03 Construct a curved piece, using curved segments.

25.04 Construct a curved piece by laminating thin strips.

26.0 PERFORM MILLWORK OPERATIONS--The student will be able to:

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26.01 Build shaped moldings to specifications.
26.02 Cut built-up moldings.
26.03 Cut a cornice.

27.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

27.01 Discuss the risks involved in the ownership of a business.
27.02 Identify the personal characteristics of a successful entrepreneur.
27.03 Identify the business skills needed to operate a small business efficiently and effectively.

28.0 DEMONSTRATE PROBLEM-SOLVING SKILLS--The student will be able to:

28.01 Organize and plan multiple tasks, utilizing various resources such as time, personnel, and materials.
28.02 Analyze problems, identify the causes, and devise plans of action.
28.03 Identify obstacles, generate alternatives, and choose the best alternatives.
28.04 Create new and better ways to perform tasks, applying the latest ideas to putting work in place.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722110
Course Title: Carpentry and Cabinetmaking 1
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to the carpentry and cabinetmaking industry. These competencies relate to safety practices, tool- and equipment utilization, identification of building materials, fasteners and hardware, basic math, communication, and blueprint reading.

01.0 APPLY SHOP AND OCCUPATIONAL SAFETY SKILLS--The student will be able to:

- 01.01 Maintain a clean, orderly, and safe work area.
- 01.02 Transport, handle, and store materials safely.
- 01.03 Operate a fire extinguisher.
- 01.04 Identify basic first-aid procedures.
- 01.05 Identify common safety hazards.
- 01.06 Explain the purpose of the Occupational Safety and Health Administration (OSHA).

02.0 UTILIZE MANUAL AND POWER TOOLS--The student will be able to:

- 02.01 Identify various hand and power tools.
- 02.02 Select correct tools for specific jobs.
- 02.03 Clean and care for tools and equipment.
- 02.04 Read and use carpenter's measuring tools.

04.0 IDENTIFY THE CHARACTERISTICS OF BUILDING MATERIALS--The student will be able to:

- 04.01 Identify the grades and species of lumber.
- 04.02 Identify the actual and nominal sizes of lumber.
- 04.03 Identify the grades of plywood and wood products.
- 04.04 Identify defects and blemishes that affect the durability and strength of lumber.
- 04.05 Explain the effects of temperature extremes, chemical reaction, and moisture content on building materials.

05.0 IDENTIFY FASTENERS AND HARDWARE--The student will be able to:

- 05.01 Identify the fasteners commonly used in carpentry and cabinetmaking.
- 05.02 Identify the hardware commonly used in carpentry and cabinetmaking.

06.0 APPLY APPROPRIATE BASIC-MATH SKILLS--The student will be able to:

06.01 Solve basic-math problems related to carpentry and cabinetmaking.
06.02 Interpret and apply metric conversion.

07.0 APPLY APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

07.01 Write logical and understandable statements.
07.02 Follow written and oral instructions.
07.03 Ask and answer questions coherently, directly, and concisely.
07.04 Demonstrate appropriate telephone communication skills.

08.0 READ BASIC BLUEPRINTS--The student will be able to:

08.01 Read an architect's scale.
08.02 Identify lines and blueprint symbols.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722120
Course Title: Carpentry and Cabinetmaking 2
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop in-depth knowledge and skills related to safety, manual and power tools, the construction industry in America, math applications, communication, and blueprint reading.

01.0 APPLY SHOP AND OCCUPATIONAL SAFETY SKILLS--The student will be able to:

- 01.07 Qualify in CPR and apply basic first-aid procedures.
- 01.08 Identify and explain the proper use of common personal protective equipment (hard hats, safety glasses, safety shoes, etc.).
- 01.09 Identify health-related problems that may result from exposure to hazardous materials.
- 01.10 Describe the proper precautions for handling hazardous materials.

02.0 UTILIZE MANUAL AND POWER TOOLS--The student will be able to:

- 02.05 Demonstrate proficiency in the safe use of hand tools and of portable and stationary power tools.

03.0 DESCRIBE THE IMPORTANCE OF THE CONSTRUCTION INDUSTRY IN THE AMERICAN ECONOMY--The student will be able to:

- 03.01 Describe the role of the construction industry within the free-enterprise system.
- 03.02 Identify career-progression opportunities in the carpentry and cabinetmaking industry.
- 03.03 Describe current issues, topics, and materials in the building-construction industry.

06.0 APPLY APPROPRIATE BASIC-MATH SKILLS--The student will be able to:

- 06.03 Solve problems, using board, linear, foot, square-foot, and cubic-foot measurements.
- 06.04 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
- 06.05 Measure horizontal and vertical surfaces, using millimeters, centimeters, feet, and inches.
- 06.06 Determine the correct purchase price of items, including the sales tax.

07.0 APPLY APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

07.05 Interpret the graphs, charts, diagrams, and tables commonly used in the carpentry or cabinetmaking industry.

08.0 READ BASIC BLUEPRINTS--The student will be able to:

08.03 Identify architectural and engineering elevations, perspectives, and schedules.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722130
Course Title: Carpentry and Cabinetmaking 3
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to the carpentry and cabinetmaking industry. These competencies relate to safety, fasteners and hardware, employability skills, customer relations, and entrepreneurship.

01.0 APPLY SHOP AND OCCUPATIONAL SAFETY SKILLS--The student will be able to:

- 01.11 Describe "Florida's Right-to-Know" Law, including the Material Safety Data Sheets (MSDS).
- 01.12 Explain eligibility and the procedures for obtaining worker's compensation.
- 01.13 Explain the importance of complying with ADA requirements for handicapped accessibility.

05.0 IDENTIFY FASTENERS AND HARDWARE--The student will be able to:

- 05.03 Identify form-work accessories such as snap-ties, wedges, pigs-feet, whalers, and stiffbacks for forming walls, beams, and columns with plywood and 2'x 4' material.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 09.01 Conduct a job search and identify advanced-training opportunities, including apprenticeship programs, if appropriate.
- 09.02 Obtain information about a job.
- 09.03 Identify documents that may be required for a job application.
- 09.04 Complete a job-application form.
- 09.05 Demonstrate competence in job-interview techniques.
- 09.06 Demonstrate productive work habits and positive attitudes.
- 09.07 Demonstrate a knowledge of how to make job changes appropriately.
- 09.08 Identify ethical and responsible practices.
- 09.09 Demonstrate acceptable hygiene practices and a professional appearance.
- 09.10 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
- 09.11 Explain the importance of taking pride in the quality of work performed.
- 09.12 Describe the importance of a drug-free workplace and industry policies toward drug and alcohol use.
- 09.13 Describe the ramifications of a poor driving record on employability opportunities.

10.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

10.01 Exercise self-control.
10.02 Identify and demonstrate appropriate responses to criticism.
10.03 Recognize basic human relations as they relate to success in the industry.
10.04 Respond to customer complaints in a positive, professional manner.
10.05 Demonstrate respect for people and property.

11.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

11.01 Define "entrepreneurship."
11.02 Describe the importance of entrepreneurship to the American economy and the role of small business in the free-enterprise system.
11.03 Debate the advantages and disadvantages of business ownership.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8720140
Course Title: Cabinet Finishing 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with an in-depth knowledge of cabinet finishing. The content includes training in the preparation of cabinets for finish and the application of finishes.

12.0 PREPARE CABINETS FOR FINISH--The student will be able to:

- 12.01 Fill nail and screw holes.
- 12.02 Install wood plugs in prepared holes.
- 12.03 Sand a cabinet and joints for finish.
- 12.04 Select and apply proper filler.
- 12.05 Sand wood surfaces for finishing.
- 12.06 Stain, bleach, fill, and seal wood surfaces, as needed.

13.0 APPLY FINISHES--The student will be able to:

- 13.01 Apply various types of finishes, including:
  - a. lacquer-based
  - b. water-based
  - c. oil-based
  - d. enamel
  - e. polyurethane
- 13.02 Apply the types of finishes that the local market demands.
- 13.03 Observe safety precautions when applying finishes, including wearing respirator and protective clothing approved by National Institute of Occupational Safety and Health (NIOSH).

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8720150
Course Title: Cabinet Assembling and Laminating 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with the competencies needed for fastening stock and joints and for assembling cabinet components.

14.0 FASTEN STOCK AND JOINTS--The student will be able to:

- 14.01 Identify types of glues and fasteners and describe their applications.
- 14.02 Fasten stock with glue and clamps.
- 14.03 Fasten stock and joints with appropriate fasteners, such as:
  - a. nails
  - b. staples
  - c. screws
  - d. bolts
- 14.04 Fill and finish nail and screw holes with fillers and plugs.
- 14.05 Glue and clamp stock, using various techniques.

15.0 ASSEMBLE CABINET COMPONENTS--The student will be able to:

- 15.01 Install hardware, such as hinges, catches, pulls, knobs, and guides, on assembled cabinets.
- 15.02 Install fasteners.
- 15.03 Install drawers.
- 15.04 Install various types of doors, including:
  - a. overlay
  - b. lipped
  - c. flush
- 15.05 Install adjustable shelving.
- 15.06 Install glass panels and metal grills.
- 15.07 Install specialty hardware, such as a lazy Susan, wire racks, and "pull-outs."
- 15.08 Install sliding doors and track.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8720160
Course Title: Cabinet Assembling and Laminating 6
Course Credit: 1

COURSE DESCRIPTION:

This course provides students with in-depth training in the installation and lamination of cabinets.

16.0 INSTALL CABINETS--The student will be able to:

- 16.01 Load and secure casework for hauling.
- 16.02 Check walls and floors for level and plumb.
- 16.03 Determine fasteners for block or walls.
- 16.04 Install upper and lower cabinets and other casework.
- 16.05 Fasten a suspended cabinet unit to ceiling.
- 16.06 Install countertops, including sink cutouts and back splash.
- 16.07 Cut and install molding and trim.
- 16.08 Adjust doors and drawers.
- 16.09 Clean work site.

17.0 APPLY LAMINATES--The student will be able to:

- 17.01 Lay out and cut core stock to specifications.
- 17.02 Lay out and cut laminate to specification.
- 17.03 Apply adhesive.
- 17.04 Apply laminate to core stock.
- 17.05 Trim and file plastic laminate edges.
- 17.06 Clean laminated surfaces.
- 17.07 Laminate a curved surface.
- 17.08 Repair laminate defects.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Chemical Instrumentation Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0641.030101
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as a chemical instrumentation technician, or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communications skills, leadership skills, human relations and employability skills, safe and efficient work practices, and assists chemists and chemical engineers in conducting chemical and physical laboratory tests for various purposes such as manufacturing production, and development of new products, materials, processing methods, and maintenance of health and safety standards.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Chemical Instrumentation industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program and provide instruction in material handling, crushing, grinding, sizing, extraction, distillation, evaporation, drying, absorption, and heat transfer, as well as design, installation, and operation of chemical manufacturing processes.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: A training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The standard credit hour length for this program is 64 according to SBR 6A-14.030.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in chemical laboratory procedures.
02.0 Demonstrate proficiency in use of chemical analytical instruments.
03.0 Demonstrate proficiency in the use of computers to interface with chemical analytical instruments.
04.0 Demonstrate proficiency in the maintenance and repair of chemical analytical instruments.
05.0 Demonstrate proficiency in calibrating chemical analytical instruments.
06.0 Demonstrate an understanding of basic organic and inorganic chemistry.
07.0 Demonstrate proficiency in spectroscopy.
08.0 Demonstrate proficiency in chromatography.
09.0 Demonstrate proficiency in electron microscopy.
10.0 Demonstrate proficiency in nuclear magnetic resonance spectroscopy.
11.0 Demonstrate proficiency in qualitative and quantitative interpretation of numerical graphic output from chemical analysis instruments.
12.0 Demonstrate an understanding of the theory and function of chemical instruments and components, including high pressure and vacuum systems, cryogenics, mass spectrometers, and computer interfaces as used in instruments to analyze surface chemistry and organic and inorganic solutions and gases.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Chemical Instrumentation Technology
Secondary Number:
Postsecondary Number: 0641.030101

01.0 DEMONSTRATE PROFICIENCY IN CHEMICAL LABORATORY PROCEDURE--The student will be able to:

- 01.01 Perform chemical extractions.
- 01.02 Perform gravimetric analysis.
- 01.03 Perform wet chemical analysis, including filtering, distilling, and titrating.
- 01.04 Use standard laboratory equipment, including pH meters, conductivity meters, and balances.
- 01.05 Perform record keeping.
- 01.06 Record uncertainties and calculate statistical uncertainties.
- 01.07 Follow all safety practices required for handling and disposal of chemicals.

02.0 DEMONSTRATE PROFICIENCY IN USE OF CHEMICAL ANALYTIC INSTRUMENTS--The student will be able to:

- 02.01 Identify the analytical applications of mass spectrometers, chromatographs, nuclear magnetic resonance spectrometers, and electron microscopes.
- 02.02 Introduce prepared gas or liquid samples into chromatographs and obtain quantitative chemical results.
- 02.03 Introduce prepared samples into nuclear magnetic spectrometers and obtain quantitative chemical results.
- 02.04 Introduce prepared samples into mass spectrometers and obtain quantitative chemical results.
- 02.05 Introduce prepared solid samples in electron microscopes and obtain results; use energy dispersive systems coupled with electronic microscopes to obtain qualitative surface chemistry analyses.

03.0 DEMONSTRATE PROFICIENCY IN THE USE OF COMPUTERS TO INTERFACE WITH CHEMICAL ANALYTICAL INSTRUMENTS--The student will be able to:

- 03.01 Describe how instrument output is collected and stored by the computer.
- 03.02 Collect, store, manipulate, and recall stored data from analytical instrument operations.
- 03.03 Create graphs and data tables using computer applications prepared for chemical analysis instruments.
- 03.04 Operate chromatographs, nuclear magnetic spectrometers, mass spectrometers, and electron microscopes using a computer interface.
- 03.05 Use computers to determine instruments status and to troubleshoot chemical analytical instruments.

04.0 DEMONSTRATE PROFICIENCY IN THE MAINTENANCE AND REPAIR OF CHEMICAL ANALYTICAL INSTRUMENTS--The student will be able to:

04.01 Perform cryogenic gas fills and cylinder changes.
04.02 Start systems after unplanned and planned down time.
04.03 Follow safety procedures in handling cryogenic gases.
04.04 Bring vacuum systems up and take vacuum systems down.
04.05 Maintain maintenance and use logs.
04.06 Perform maintenance to the gas systems, including plumbing lines, reattaching regulators.
04.07 Describe regulators and pressures.

05.0 DEMONSTRATE PROFICIENCY IN CALIBRATING CHEMICAL ANALYTICAL INSTRUMENTS--The student will be able to:

05.01 Adjust filament voltages to tune mass spectrometers.
05.02 Introduce standard compounds into gas chromatographs and change columns as needed to calibrate chromatograph.
05.03 Run computer checks, components checks, and system checks.
05.04 Adjust apertures and beam widths.
05.05 Identify various deuterated solvents, and their chemical shifts.
05.06 Recognize "spinning side bands" and ferromagnetic impurities.
05.07 Run QC/QA samples.

06.0 DEMONSTRATE AN UNDERSTANDING OF BASIC ORGANIC AND INORGANIC CHEMISTRY--The student will be able to:

06.01 Explain molecular structure in terms of chemical bonding.
06.02 Apply stoichiometric relations to chemical equations.
06.03 Be able to write formulas of selected compounds from their names and vice versa.
06.04 Apply the principles of Charles', Boyle's, Graham's and Dalton's laws.
06.05 Classify compounds into appropriate groups based on their properties.
06.06 Understand quantitative relationships to express solution concentrations.
06.07 Apply the principals of stereochemistry, stereoselectivity and stereospecificity.
06.08 Identify organic compounds through the interpretation of NMR, IR, C13NMR and Mass Spectroscopy.
06.09 Learn the concepts of enantiotopic and diastereotopic ligands faces.
06.10 Demonstrate an understanding research design and the ethical issues in scientific research.

07.0 DEMONSTRATE PROFICIENCY IN MASS SPECTROSCOPY--The student will be able to:

07.01 Prepare samples for introduction into a mass spectrometer.
07.02 Introduce samples into a mass spectrometer.
07.03 Obtain mass spectra of specific compounds using a mass spectrometer as a single instrument or as part of a gas

chromatograph, ion trap chromatograph, or inductively coupled argon plasma system.

07.04 Calibrate mass spectrometers using appropriate calibration standards and by adjusting filament voltage.

07.05 Clean the ion source.

07.06 Perform maintenance on a mass spectrometer.

07.07 Perform trouble-shooting of a mass spectrometer as a single instrument or as part of a gas chromatograph, ion trap chromatograph, or inductively coupled argon plasma system.

07.08 Describe the abilities and limitations of chromatographs.

07.09 Describe the physics of mass spectrometry.

07.10 Describe the relationships between thin layer, column, paper, gas chromatograph, ion chromatograph, supercritical fluid chromatograph.

08.0 DEMONSTRATE PROFICIENCY IN CHROMATOGRAPHY--The student will be able to:

08.01 Prepare samples of introduction into a chromatograph.

08.02 Inject samples into a chromatograph.

08.03 Calibrate a chromatograph using appropriate calibration standards and by cleaning or changing columns.

08.04 Perform maintenance on a chromatograph, including changing cryogenic gas cylinders.

08.05 Perform trouble-shooting of a chromatograph.

08.06 Describe the capabilities and limitations of chromatography.

08.07 Describe the physics of chromatography.

09.0 DEMONSTRATE PROFICIENCY IN ELECTRON MICROSCOPY--The student will be able to:

09.01 Prepare samples for introduction into an electron microscope.

09.02 Introduce samples into an electron microscope, including closing and opening the electron gun, emptying and restoring vacuum, and placing the sample.

09.03 Obtain magnified images of organic and inorganic samples.

09.04 Obtain elemental analysis of the surface of samples using an energy dispersive system coupled to an electron microscope.

09.05 adjust aperture, beam width, voltage, and current to obtain optimum image resolution.

09.06 Calibrate an electron microscope and energy dispersive system.

09.07 Perform maintenance on an electron microscope and energy dispersive system, including gas fills.

09.08 Perform trouble-sheeting of an electron microscope and energy dispersive system.

09.09 Describe the mechanics of the electron gun, the vacuum system, and the sample stage.

09.10 Describe the physics of electron microscopy for image magnification and energy dispersion for elemental analysis.

09.11 Describe the relationships between resolution and aperture, beam width, voltage, magnifications, and current.

10.0 DEMONSTRATE PROFICIENCY IN NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY--The student will be able to:

10.01 Prepare samples for analysis with a nuclear magnetic spectrometer.
10.02 Place samples into the nuclear magnetic spectrometers, probe, and check spinner.
10.03 Adjust shim, field frequency, and local to obtain optimum resolution.
10.04 Calibrate a nuclear magnetic spectrometer, by locking to appropriate solvent.
10.05 Perform maintenance on a nuclear magnetic spectrometer, including changing cryogenic gas cylinders.
10.06 Perform trouble-shooting of a nuclear magnetic spectrometer.
10.07 Describe the abilities and limitations of nuclear magnetic spectrometers.
10.08 Describe the physics of nuclear magnetic spectrometers.
10.09 Describe the relationships between sample size, and 60-500 MHz instruments.

11.0 INTERPRET QUANTITATIVE AND GRAPHIC OUTPUT FROM CHEMICAL ANALYSIS INSTRUMENTS--The student will be able to:

11.01 Identify elements and/or chemical compounds present in a sample from graphic output.
11.02 Identify relative concentrations of chemical elements and/or compounds present in a sample from graphic output.
11.03 Quantify results of chemical analyses using numerical output.
11.04 Use statistics to record uncertainties.
11.05 Prepare written reports of results.

12.0 DEMONSTRATE AN UNDERSTANDING OF THE THEORY AND FUNCTION OF CHEMICAL INSTRUMENTS AND COMPONENTS, INCLUDING HIGH PRESSURE AND VACUUM SYSTEMS, CRYOGENICS, MASS SPECTROMETERS, AND COMPUTER INTERFACES AS USED IN INSTRUMENTS TO ANALYZE SURFACE CHEMISTRY AND ORGANIC AND INORGANIC SOLUTIONS AND GASES--The student will be able to:

12.01 Describe the use of vacuum systems in modern laboratory applications.
12.02 Demonstrate an understanding of the theory and operation of infrared, nuclear magnetic resonance, gas chromatograph/mass spectrometers scanning electron microscopes, and Atomic absorption.
12.03 Describe current applications and limitations for each analytical instrument in industry.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Chemical Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0641.030100
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as chemical laboratory technicians, DOT 022.261-010, or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and assists chemists and chemical engineers in conducting chemical and physical laboratory tests for various purposes such as manufacturing production, and the development of new products, materials, processing methods, and maintenance of health and safety standards.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Chemical industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in material handling, crushing, grinding, sizing, extraction, distillation, evaporation, drying, absorption, and heat transfer, as well as design, installation, and operation of chemical manufacturing processes.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The standard credit hour length of this program is 64 in accordance with SBR 6A-14.030.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate laboratory safety procedures.
02.0 Demonstrate basic laboratory skills.
03.0 Set up and operate laboratory equipment and instruments.
04.0 Perform basic laboratory calculations and measurements.
05.0 Provide maintenance of equipment and supplies.
06.0 Perform analysis procedures on food substances.
07.0 Perform air and water analysis procedures.
08.0 Read and interpret technical reports.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate appropriate math skills.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate employability skills.
13.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Chemical Technology
Secondary Number:
Postsecondary Number: 0641.030100

01.0 DEMONSTRATE LABORATORY SAFETY PROCEDURES--The student will be able to:

- 01.01 Select safety supplies appropriate to task.
- 01.02 Operate safety equipment to provide personal and environmental safety.
- 01.03 Apply procedures to handle hazardous reagents, hot materials, sharp objects, and contaminating materials.
- 01.04 Utilize and identify appropriate safety clothing.

02.0 DEMONSTRATE BASIC LABORATORY SKILLS--The student will be able to:

- 02.01 Select appropriate glassware for task.
- 02.02 Weigh chemical reagents to prepare solutions or stains.
- 02.03 Mix chemicals to prepare reagents, solutions or stains.
- 02.04 Store prepared solutions and stains to maintain optimal condition.
- 02.05 Test solution with pH paper.
- 02.06 Determine percentage of alcohol reagents in a solution.
- 02.07 Filter substances to obtain residues.
- 02.08 Titrate solutions to obtain level of Ph.

03.0 SET UP AND OPERATE LABORATORY EQUIPMENT AND INSTRUMENTS--The student will be able to:

- 03.01 Operate pH meter.
- 03.02 Operate compound microscope.
- 03.03 Utilize oil immersion lens.
- 03.04 Operate Bunsen/Fisher burner safely.
- 03.05 Calibrate burette to prepare cure.
- 03.06 Operate balance scale.
- 03.07 Operate centrifuge.
- 03.08 Operate timing device.
- 03.09 Utilize autoclaves, hot air oven, and disinfectants.
- 03.10 Operate sound level measuring devices.
- 03.11 Operate a turbidimeter.
- 03.12 Operate gas chromatograph.
- 03.13 Operate technicon analyzer.

04.0 PERFORM BASIC LABORATORY CALCULATIONS AND MEASUREMENTS--The student will be able to:

- 04.01 Calculate quantities needed to perform a test analysis.
- 04.02 Measure volume of a solution to perform a laboratory test.
- 04.03 Measure length of an area in metrics.
- 04.04 Measure temperatures accurately.

05.0 PROVIDE MAINTENANCE OF EQUIPMENT AND SUPPLIES--The student will be able to:

05.01 Wash laboratory equipment appropriately.
05.02 Sterilize equipment to decontaminate soiled materials.
05.03 Inventory supplies and equipment.
05.04 Prepare equipment appropriately for tests.
05.05 Ensure optimal working condition of equipment and devices.

06.0 PERFORM ANALYSIS PROCEDURES ON FOOD SUBSTANCES--The student will be able to:

06.01 Describe the cultivation and growth of microorganisms.
06.02 Perform a standard plate count.
06.03 Examine microbiology.
06.04 Identify sources of contamination.
06.05 Perform a yeast and mold count.
06.06 Test food for disease.
06.07 Count bacteria using microscope.
06.08 Identify principles of food preparation.
06.09 Describe controlled atmosphere storage.
06.10 Perform heat sterilization techniques.
06.11 Evaluate containers.
06.12 Describe preparatory treatments for food.
06.13 Identify quality attributes.
06.14 Perform sediment test.
06.15 Evaluate pasteurization using phosphate test.
06.16 Define properties of sanitation of substances.

07.0 PERFORM AIR AND WATER ANALYSIS PROCEDURES--The student will be able to:

07.01 Describe characteristics of protists.
07.02 Determine emission rate using EPA methods.
07.03 Sample and analyze oxides in gases.
07.04 Describe pollution control practices.
07.05 Describe measurements of flow rates.
07.06 Analyze water using portable test kit.
07.07 Measure concentration of metals in water.
07.08 Perform toxicity test.
07.09 Determine oxygen demand and waste water out flows using standard methods.
07.10 Determine oil and grease concentration in wastewater outflow.
07.11 Describe characteristics of wastewater.
07.12 Apply federal pollution regulations.
07.13 Analyze properties of solids and liquids.

08.0 READ AND INTERPRET TECHNICAL REPORTS--The student will be able to:

08.01 Define chemical terms.
08.02 Identify chemical abbreviations.
08.03 Interpret chemical equations and specifications.
08.04 Analyze graphs and charts.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 09.03 Read and follow written and oral instructions.
- 09.04 Answer and ask questions coherently and concisely.
- 09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 11.02 Draw conclusions or make inferences from data.
- 11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 12.01 Conduct a job search.
- 12.02 Secure information about a job.
- 12.03 Identify documents which may be required when applying for a job interview.
- 12.04 Complete a job application form correctly.
- 12.05 Demonstrate competence in job interview techniques.
- 12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
- 12.07 Identify acceptable work habits.
- 12.08 Demonstrate knowledge of how to make job changes appropriately.
- 12.09 Demonstrate acceptable employee health habits.
- 12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.
13.05 Identify the necessary personal characteristics of a successful entrepreneur.
13.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CLUSTER CURRICULUM FRAMEWORK

CURRICULUM FRAMEWORK

Cluster Title:	Clock, Watch, Jewelry Making And Repair Cluster
Cluster Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	Core, 2 Programs And 9 Occupational Completion Points
	PSAV
Grade Level:	30, 31, Adult Vocational
Length:	1350 Hours
Facility Code:	245
VSO:	VICA
COOP Method:	Yes
Apprenticeship:	No

I. **PURPOSE**: The purpose of the programs in this cluster is to prepare students for employment and/or specialized training in the clock/watch and jewelry occupations. The programs in this cluster also provide supplemental training for persons previously or currently employed in the clock/watch and jewelry industry. The clock and watch program should meet the essentials and guidelines for recognition by the American Watchmaker and Clockmaker Institute (AWI).

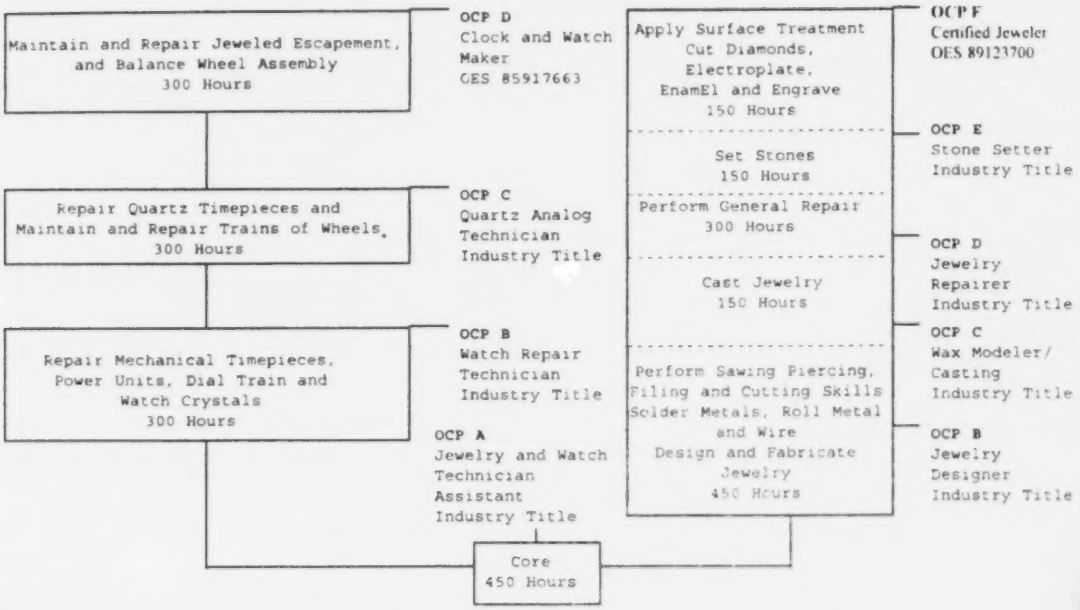
This cluster focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Clock/Watch and Jewelry Repair industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **CLUSTER STRUCTURE**: This cluster is a planned sequence of instruction consisting of two programs with a common core and 9 occupational completion points. When the recommended sequence is followed, the structure will allow students who successfully complete specified competencies to exit for employment or articulate into specialized training.

It is recommended that students complete the core or demonstrate a mastery of the student performance standards contained in the core before advancing to the course(s) in the next level of the programs. Competencies established by the Clock/Watch and Jewelry Repair Industries for "Clock/Watch and Jewelry Repair Standards" plus integration of academic requirements and training in communications, leadership, human relations, employability skills and safe, efficient work practices account for 450 hours in the CORE curriculum.

III. The following diagram illustrates the cluster structure, occupational completion points and job titles:

CLOCK, WATCH, JEWELRY MAKING AND REPAIR



IV. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of the Clock/Watch and Jewelry cluster. These activities provide instruction in the use of equipment, tools, materials and processes found in the clock, watch and jewelry industries.

V. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc. is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational student organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC. Planned and supervised instructional activities must be provided through one or more of the following: (1) directed laboratory experience (2) student projects (3) placement for experience (4) cooperative experience.

The cooperative method is appropriate for this program. Whenever the cooperative method is offered, the following is required for each student: a training agreement, a training plan signed by the student, teacher and employer that including instructional objectives and a list of on-the-job and in-school learning experiences, and a work station that reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must be paid for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade levels required for postsecondary adult vocational students to exit the programs in this cluster are listed at the program level or at the occupational completion points within the program. These grade level numbers correspond to a grade equivalent score obtained on one of the state designated basic skills examinations. If a student does not meet the basic skills level required for completion from the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) laboratory or prior to admission in an Adult Basic Education (ABE) setting.

To be transferable statewide between institutions, these programs/courses must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this program must include methods that require students to identify, organize and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate the methods to improve students' personal qualities and high-order thinking skills.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643 F.S.

Florida Department of Education
INTENDED OUTCOMES

Program Title: Clock and Watch Repair

PSAV
Program Number: I470408
CIP Number: 0647.040800
Grade Level: 30,31
Length: 1350 Hours
Certification: WATCH REPR @ 7G INSTRMENT @ 7G
Basic Skills:
Math 9
Language 9
Reading 9

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Clock, Watch, and Jewelry Technical Assistant - Industry Title

01.0 Develop basic trade skills.
(01.01-01.07)
02.0 Demonstrate safe use of basic tools and equipment.
(02.01)
03.0 Perform sawing, piercing, filing and cutting skills.
(03.01)
04.0 Solder metals.
(04.01-04.03)
05.0 Perform general repairs.
(05.01-05.04)
06.0 Perform polishing techniques.
(06.01-06.04)
07.0 Perform shop management skills.
(07.01-07.02)
08.0 Identify timepieces.
(08.01-08.02)
09.0 Demonstrate appropriate communication skills.
(09.01-09.07)
10.0 Demonstrate appropriate math skills.
(10.01-10.06)
11.0 Demonstrate appropriate understanding of basic science.
(11.01-11.02)
12.0 Demonstrate employability skills.
(12.01-12.12)
13.0 Demonstrate an understanding of entrepreneurship.
(13.01-13.07)

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Clock and Watch Repair Technician - Industry Title

02.0 Demonstrate safe use of basic tools and equipment.
(02.02-02.07)
07.0 Perform shop management skills.
(07.03-07.06)
10.0 Demonstrate appropriate math skills.
(10.07-10.10)
11.0 Demonstrate appropriate understanding of basic science.
(11.03-11.05)
14.0 Repair mechanical timepieces.
(14.01-14.07)
15.0 Repair power units.
(15.01-15.03)
16.0 Repair dial train.
(16.01-16.04)
17.0 Replace watch crystals.
(17.01)

OCCUPATIONAL COMPLETION POINT - DATA CODE C
Quartz Analog Technician - Industry Title

18.0 Maintain and repair train of wheels.
(18.01-18.05)
19.0 Repair quartz timepieces.
(19.01-19.11)

OCCUPATIONAL COMPLETION POINT - DATA CODE D
Clock and Watch Maker - OES 85917663

09.0 Demonstrate appropriate communication skills.
(09.08)
20.0 Maintain and repair jeweled escapement.
(20.01-20.02)
21.0 Maintain and repair balance wheel assembly.
(21.01-21.08)

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Clock And Watch Repair
Postsecondary Number: I470408

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Clock, Watch, and Jewelry Technical Assistant - Industry Title

01.0 **DEVELOP BASIC TRADE SKILLS**--The student will be able to:

- 01.01 Organize shop and maintain tools.
- 01.02 Identify safety skills.
- 01.03 Develop measuring and weighing skills.
- 01.04 Test and identify metals.
- 01.05 Identify problems with quartz watches.
- 01.06 Identify and use proper hand tools and equipment.
- 01.07 Demonstrate a knowledge of the "FL Right-to-Know Law" as recorded in Florida Statutes, Chapter 442.

02.0 **DEMONSTRATE SAFE USE OF BASIC TOOLS AND EQUIPMENT**--The student will be able to:

- 02.01 Practice tool and equipment safety.

03.0 **PERFORM SAWING, PIERCING, FILING AND CUTTING SKILLS**--The student will be able to:

- 03.01 Identify appropriate sawing, piercing, filing and cutting skills.

04.0 **SOLDER METALS**--The student will be able to:

- 04.01 Select soldering equipment and hand tools.
- 04.02 Select appropriate solder and flux.
- 04.03 Solder metals.

05.0 **PERFORM GENERAL REPAIR**--The student will be able to:

- 05.01 Replace watch batteries, gaskets, band, pins and round watch crystals.
- 05.02 Remove and replace watch stems.
- 05.03 Repair and replace finding.
- 05.04 Repair basic chain links.

06.0 **PERFORM POLISHING TECHNIQUES**--The student will be able to:

- 06.01 Buff metals using abrasives.
- 06.02 Polish metals.
- 06.03 Clean metals.
- 06.04 Polish plastic crystals.

07.0 **PERFORM SHOP MANAGEMENT SKILLS**--The student will be able to:

07.01 Apply positive relations with employer or client.
07.02 Identify and assess repairs.

08.0 **IDENTIFY TIMEPIECES**--The student will be able to:

08.01 Use standard references and computerized database to identify watch movements and replacement parts.
08.02 Describe timepiece parts and their functions.

09.0 **DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS**--The student will be able to:

09.01 Apply positive customer relations skills.
09.02 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.03 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.04 Read and follow written and oral instructions.
09.05 Answer and ask questions coherently and concisely.
09.06 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.07 Demonstrate appropriate telephone/communication skills.

10.0 **DEMONSTRATE APPROPRIATE MATH SKILLS**--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.04 Determine the correct purchase price, to include sales tax and discounts.
10.05 Demonstrate an understanding of federal, state and local taxes and their computation.
10.06 Demonstrate an understanding of applied computer skills.

11.0 **DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE**--The student will be able to:

11.01 Demonstrate knowledge of metallurgy.
11.02 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

12.0 **DEMONSTRATE EMPLOYABILITY SKILLS**--The student will be able to:

12.01 Perform safety and health practices.
12.02 Understand employment capabilities.
12.03 Demonstrate appropriate work behavior.
12.04 Project a professional image.

12.05 Work individually and cooperatively as a member of regular or culturally diverse team.
12.06 Utilize communication skills applicable to the industry.
12.07 Balance personal and professional life.
12.08 Use and conserve resources and energy.
12.09 Locate and select employment opportunities.
12.10 Demonstrate employment seeking skills.
12.11 Use and conserve resources and energy.

13.0 **DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP**--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.
13.05 Identify the necessary personal characteristics of a successful entrepreneur.
13.06 Identify the business skills needed to operate a small business efficiently and effectively.
13.07 Adapt to change.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Clock and Watch Repair Technician - Industry Title

02.0 **DEMONSTRATE SAFE USE OF BASIC TOOLS AND EQUIPMENT**--The student will be able to:

02.02 Operate polishing machine.
02.03 Operate ultrasonic cleaning machine.
02.04 Operate staking set.
02.05 Operate lathe.
02.06 Perform staking set procedures.
02.07 Perform basic lathe procedures.

07.0 **PERFORM SHOP MANAGEMENT SKILLS**--The student will be able to:

07.03 Prepare cost estimates and work orders.
07.04 Maintain a shop production schedule.
07.05 Maintain inventory.
07.06 Explain impact of professional trade organizations on the industry.

10.0 **DEMONSTRATE APPROPRIATE MATH SKILLS**--The student will be able to:

10.07 Determine measurements in millimeters and inches.
10.08 Determine tap size of crowns.
10.09 Determine size of movements using ligne gauge.
10.10 Use Dennison and millimeter measures to determine replacement size for mainspring.

11.0 **DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE**--The student will be able to:

11.03 Draw conclusions or make inferences from data.
11.04 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
11.05 Understand pressure measurement in terms of P.S.I., inches of mercury and K.P.A.

14.0 **REPAIR MECHANICAL TIMEPIECES**--The student will be able to:

14.01 Disassemble and inspect timepiece.
14.02 Make repair parts using jeweler's lathe.
14.03 Repair timepiece.
14.04 Clean timepiece.
14.05 Assemble time train.
14.06 Assemble dial train.
14.07 Synchronize and test timepiece.

15.0 **REPAIR POWER UNITS**--The student will be able to:

15.01 Disarm mainspring.
15.02 Repair or replace mainspring.
15.03 Repair or replace barrel piece and cover.

16.0 **REPAIR DIAL TRAIN**--The student will be able to:

16.01 Repair and adjust dial train.
16.02 Repair setting mechanism.
16.03 Repair and adjust winding mechanism.

17.0 **REPLACE WATCH CRYSTALS**--The student will be able to:

17.01 Identify fancy crystal replacements.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
Quartz Analog Technician - Industry Title

18.0 **MAINTAIN AND REPAIR TRAIN OF WHEELS**--The student will be able to:

18.01 Make gears using gear cutter.
18.02 Straighten pivots and gears.
18.03 Re-pivot arbors and replace teeth or gears.
18.04 Replace jeweled or metal bushings.
18.05 Straighten bent pivots.
18.06 Repivot broken pivots.
18.07 Rue wheels.
18.08 Perform advanced lathe procedures.

19.0 **REPAIR QUARTZ TIMEPIECES**--The student will be able to:

19.01 Identify movement manufacturer.
19.02 Test and identify battery replacement.
19.03 Install new batteries.
19.04 Replace defective gaskets.

19.05 Use waterproof case opener.
19.06 Use case press.
19.07 Use waterproof testing device.
19.08 Identify failures using testing device.
19.09 Determine replacement movements.
19.10 Select strategy for replacing versus repairing movements.
19.11 Clean quartz movements.

OCCUPATIONAL COMPLETION POINT - DATA CODE D
Watch Maker - OES 85917663

09.0 **DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS**--The student will be able to:

09.08 Reinforce proper business ethics.

20.0 **MAINTAIN AND REPAIR JEWELED ESCAPEMENT**--The student will be able to:

20.01 Repair and adjust timepiece escapement.
20.02 Repivot pallet arbor.
20.03 Replace pallet jewels.

21.0 **MAINTAIN AND REPAIR BALANCE WHEEL ASSEMBLY**--The student will be able to:

21.01 Replace friction and rivet-type balance staffs.
21.02 True balance wheel.
21.03 Poise balance wheel.
21.04 Straighten hair spring.
21.05 Replace roller and jewel.
21.06 Modify new balance staff.
21.07 Clean and service balance jewels.
21.08 Perform staking set procedures.

Florida Department of Education
Intended Outcomes

Program Title:	**Jewelry Manufacturing And Repair**
	PSAV
Program Number:	**I480602**
CIP Number:	0648.060200
Grade Level:	30,31
Length:	1650 Hours
Certification	METAL WORK @ 7G JWLY MFGR @ 7G
Basic Skills:	
Math	9
Language	9
Reading	9

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Clock, Watch, and Jewelry Technical Assistant - Industry Title

01.0 Develop basic trade skills.
(01.01-01.07)
02.0 Demonstrate safe use of basic tools and equipment.
(02.01)
03.0 Perform sawing, piercing, filing and cutting skills.
(03.01)
04.0 Solder metals.
(04.01-04.03)
05.0 Perform general repairs.
(05.01-05.04)
06.0 Perform polishing techniques.
(06.01-06.04)
07.0 Perform shop management skills.
(07.01-07.02)
08.0 Identify timepieces.
(08.01-08.02)
09.0 Demonstrate appropriate communication skills.
(09.01-09.07)
10.0 Demonstrate appropriate math skills.
(10.01-10.06)
11.0 Demonstrate appropriate understanding of basic science.
(11.01-11.02)
12.0 Demonstrate employability skills.
(12.01-12.12)
13.0 Demonstrate an understanding of entrepreneurship.
(13.01-13.07)

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Jewelry Designer - Industry Title

02.0 Demonstrate safe use of basic tools and equipment.
(02.02-02.03)
03.0 Perform sawing, piercing, filing and cutting skills.
(03.02-03.05)
04.0 Solder metals.
(04.04)
07.0 Perform shop management skills.
(07.03-07.06)
11.0 Demonstrate an appropriate understanding of basic science.
(11.03-11.05)
22.0 Roll metal and wire.
(22.01-22.03)
23.0 Design and fabricate jewelry.
(23.01-23.02)

OCCUPATIONAL COMPLETION POINT - DATE CODE C
Wax Modeler/Casting - Industry Title

24.0 Cast Jewelry.
(24.01-24.03)

OCCUPATIONAL COMPLETION POINT - DATE CODE D
Jewelry Repairer - Industry Title

05.0 Perform general repair.
(05.05-05.09)

OCCUPATIONAL COMPLETION POINT - DATE CODE E
Stone Setter - Industry Title

25.0 Set Stones.
(25.01-25.08)

OCCUPATIONAL COMPLETION POINT - DATE CODE F
Certified Jeweler - OES 89123700

09.0 Demonstrate appropriate communication skills.
(09.08)
26.0 Apply surface treatment.
(26.01-26.06)

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Jewelry Manufacturing And Repair
Postsecondary Number: I480602

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Clock, Watch, and Jewelry Technical Assistant - Industry Title

01.0 **DEVELOP BASIC TRADE SKILLS**--The student will be able to:

- 01.01 Organize shop and maintain tools.
- 01.02 Identify safety skills.
- 01.03 Develop measuring and weighing skills.
- 01.04 Test and identify metals.
- 01.05 Identify problems with quartz watches.
- 01.06 Select and use hand tools and equipment.
- 01.07 Demonstrate a knowledge of the "FL Right-to-Know Law" as recorded in Florida Statutes, Chapter 442.

02.0 **DEMONSTRATE SAFE USE OF BASIC TOOLS AND EQUIPMENT**--The student will be able to:

- 02.01 Handle tools and equipment safely.

03.0 **PERFORM SAWING, PIERCING, FILING AND CUTTING SKILLS**--The student will be able to:

- 03.01 Identify appropriate sawing, piercing, filing and cutting skills.

04.0 **SOLDER METALS**--The student will be able to:

- 04.01 Select soldering equipment and hand tools.
- 04.02 Select appropriate solder and flux.
- 04.03 Solder metals.

05.0 **PERFORM GENERAL REPAIR**--The student will be able to:

- 05.01 Replace watch batteries, gaskets, band, pins and round watch crystals.
- 05.02 Remove and replace watch stems.
- 05.03 Repair and replace finding.
- 05.04 Repair basic chain links.

06.0 **PERFORM POLISHING TECHNIQUES**--The student will be able to:

- 06.01 Buff metals using abrasives.
- 06.02 Polish metals.
- 06.03 Clean metals.
- 06.04 Polish plastic crystals.

07.0 **PERFORM BASIC MANAGEMENT SKILLS**--The student will be able to:

07.01 Apply positive relations with employer or client.
07.02 Identify and assess repairs.

08.0 **IDENTIFY TIMEPIECES**--The student will be able to:

08.01 Use standard references and computerized database to identify watch movements and replacement parts.
08.02 Describe timepiece parts and their functions.

09.0 **DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS**--The student will be able to:

09.01 Apply positive customer relations skills.

09.02 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.03 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.04 Read and follow written and oral instructions.
09.05 Answer and ask questions coherently and concisely.
09.06 Read critically by recognizing assumptions and implications and by valuating ideas.
09.07 Demonstrate appropriate telephone/communication skills.
09.08 Reinforce proper business ethics.

10.0 **DEMONSTRATE APPROPRIATE MATH SKILLS**--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.04 Determine the correct purchase price, to include sales tax and discounts.
10.05 Demonstrate an understanding of federal, state and local taxes and their computation.
10.06 Demonstrate an understanding of applied computer skills.

11.0 **DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE**--The student will be able to:

11.01 Demonstrate knowledge of metallurgy.
11.02 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

12.0 **DEMONSTRATE EMPLOYABILITY SKILLS**--The student will be able to:

12.01 Perform safety and health practices.
12.02 Understand employment capabilities.
12.03 Demonstrate appropriate work behavior.

12.04 Project a professional image.
12.05 Work individually and cooperatively as a member of regular or cultural diverse team.
12.06 Utilize communication skills applicable to the industry.
12.07 Balance personal and professional life.
12.08 Use and conserve resources and energy.
12.09 Locate and select employment opportunities.
12.10 Demonstrate employment seeking skills.
12.11 Use and conserve resources and energy.

13.0 **DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP**--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.
13.05 Identify the necessary personal characteristics of a successful entrepreneur.
13.06 Identify the business skills needed to operate a small business efficiently and effectively.
13.07 Adapt to change.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Jewelry Designer - Industry Title

02.0 **DEMONSTRATE SAFE USE OF BASIC TOOLS AND EQUIPMENT**--The student will be able to:

02.02 Operate polishing machine.
02.03 Operate ultrasonic cleaning machine.

03.0 **PERFORM SAWING, PIERCING, FILING AND CUTTING SKILLS**--The student will be able to:

03.02 Use sawing techniques.
03.03 Use piercing techniques.
03.04 Use filing techniques.
03.05 Use cutting techniques.

04.0 **SOLDER METALS**--The student will be able to:

04.04 Solder jewelry.

07.0 **PERFORM BASIC MANAGEMENT SKILLS**--The student will be able to:

07.03 Prepare cost estimates and work orders.
07.04 Maintain a shop production schedule.
07.05 Maintain inventory.
07.06 Explain impact of professional trade organizations on the industry.

11.0 **DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE**--The student will be able to:

11.03 Draw conclusions or make inferences from data.
11.04 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
11.05 Understand pressure measurement in terms of P.S.I., inches of mercury and K.P.A.

22.0 **ROLL METAL AND WIRE**--The student will be able to:

22.01 Melt precious metals into ingots.
22.02 Roll ingot into sheet metalwire.
22.03 Construct a tubing wire.

23.0 **DESIGN AND FABRICATE JEWELRY**--The student will be able to:

23.01 Design and fabricate jewelry using wire.
23.02 Design and fabricate jewelry using jewelry metals.

OCCUPATIONAL COMPLETION POINT - DATE CODE C
Wax Modeler/Casting - Industry Title

24.0 **CAST JEWELRY**--The student will be able to:

24.01 Identify types of casting methods.
24.02 Design and sculpture wax models and molds.
24.03 Cast jewelry pieces using lost wax process.

OCCUPATIONAL COMPLETION POINT - DATE CODE D
Jewelry Repairer - Industry Title

05.0 **PERFORM GENERAL REPAIRS**--The student will be able to:

05.05 Analyze and perform advanced chain link repair.
05.06 Size ring.
05.07 Reshank ring.
05.08 Repair prong.
05.09 Repair hinge.

OCCUPATIONAL COMPLETION POINT - DATE CODE E
Stone Setter - Industry Title

25.0 **SET STONES**--The student will be able to:

25.01 Test and identify stones.
25.02 Set stone in a pronged mounting.
25.03 Set stone in a bezel setting.
25.04 Set stone in a baguette setting.
25.05 Set stone in a pave setting.
25.06 Set stone in a peg setting.
25.07 Set stone in a tube setting.
25.08 Set stone in a channel setting.

OCCUPATIONAL COMPLETION POINT - DATE CODE F

Certified Jeweler - OES 89123700

09.0 **DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS**--The student will be able to:

09.08 Reinforce proper business ethics.

26.0 **APPLY SURFACE TREATMENT**--The student will be able to:

26.01 Identify surface techniques.
26.02 Electroplate jewelry.
26.03 Perform diamond cutting.
26.04 Apply enamel to metal.
26.05 Apply repousse' and chasing techniques.
26.06 Apply engraving techniques.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Commercial and Industrial Insulation
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	One Occupational Completion Point
	PSAV
Program Numbers	**I460407**
CIP Number	0646.040700
Grade Level	30, 31
Facility Code	203
VSO	VICA
Co-op Method	Yes
Apprenticeship	Yes

I. **PURPOSE**: The purpose of this program is to prepare students for employment or advanced training in the commercial and industrial insulation industry. This program also provides supplemental training for persons previously or currently employed in the commercial and industrial insulation industry.

This program focuses on the installation of commercial and industrial insulation. It also focuses on broad, transferable skills, stresses the understanding of all aspects of the commercial and industrial insulation industry, and demonstrates such elements of the industry as technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

II. **PROGRAM STRUCTURE**: This program is a planned sequence of instruction with one occupational completion point that allows students to achieve the competencies necessary for employment in the industry.

III. **LABORATORY ACTIVITIES**: Classroom, shop, and laboratory activities are an integral part of this program. These activities include training in the general maintenance and safe use of all instructional resources. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation. A generic equipment list for this program is available.

IV. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., (VICA) is the appropriate vocational student organization (VSO) for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

This program is offered in postsecondary adult vocational (PSAV) courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The cooperative method of instruction, on-the-job training (OJT), is appropriate for this program. Whenever the cooperative method is offered, the following are required for each student: (1) a training plan that is signed by the student, teacher, and employer and that includes instructional objectives and a list of on-the-job and in-school learning experiences and (2) a workstation that reflects the equipment, skills, and tasks relevant to the occupation that the student has chosen as a career goal. The student must be paid for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic-skills grade levels required for postsecondary adult vocational students to exit this program are listed before the intended outcomes for the program. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion of the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) or a remedial lab. Please refer to the Rule for exemptions.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

SCANS Competencies: To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this program must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Commercial and Industrial Insulation

	PSAV
Program Number	**I460407**
CIP Number	0646040700
Grade Level	30, 31
Length	1200 hours
Certification	TEC CONSTR ¶7 ¶G
	BLDG CONST ¶7 ¶G
	INSULAT @7 G
Basic Skills	
Math	8
Language	8
Reading	8

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
INSULATION WORKER - DOT Code 863.364-014

01.0 Demonstrate a knowledge and the use of personal protective equipment (PPE).
02.0 Demonstrate state-of-the-art work practices.
03.0 Identify safety hazards and ways to protect against them.
04.0 Demonstrate appropriate communication skills.
05.0 Apply appropriate math skills.
06.0 Explain and demonstrate appropriate field safety rules and procedures.
07.0 Demonstrate a knowledge of the general applications and uses of commercial and industrial insulation.
08.0 Apply insulation theory to job needs.
09.0 Read and interpret blueprints and specifications.
10.0 Estimate and order materials for a job site.
11.0 Apply various insulation materials.
12.0 Install accessory materials for insulation.
13.0 Perform specialized insulation activities.
14.0 Demonstrate an understanding of the appropriate basic science.
15.0 Demonstrate employability skills.
16.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Commercial and Industrial Insulation
Secondary Number:
Postsecondary Number: I460407

OCCUPATIONAL COMPLETION POINT - DATA CODE A
INSULATION WORKER - DOT Code 863.364-014

01.0 DEMONSTRATE A KNOWLEDGE AND THE USE OF PERSONAL PROTECTIVE EQUIPMENT (PPE)--The student will be able to:

- 01.01 Evaluate the classes and characteristics of respirator types.
- 01.02 Identify the limitations of respirators.
- 01.03 Determine the proper selection, inspection, donning, use, maintenance, and storage procedures of respirators.
- 01.04 Perform positive- and negative-pressure fit checks.
- 01.05 Describe qualitative- and quantitative-fit testing procedures.
- 01.06 Identify the components of a proper respiratory-protection program.
- 01.07 Select and use personal protective clothing.
- 01.08 Use, handle, and store nondisposable clothing.
- 01.09 Examine work-area entry and exit procedures for personal protection.
- 01.10 Identify the activities that are prohibited for personal protection.
- 01.11 Identify individuals, such as family members, who may be exposed to hazardous materials.
- 01.12 Describe the regulations that relate to personal protective equipment.

02.0 DEMONSTRATE STATE-OF-THE-ART WORK PRACTICES--The student will be able to:

- 02.01 Display proper work practices for abatement activities.
- 02.02 Demonstrate the proper construction and maintenance of barriers and decontamination enclosure systems.
- 02.03 Position warning signs.
- 02.04 Demonstrate the proper lockout of electrical and ventilation systems.
- 02.05 Utilize negative-pressure exhaust-ventilation equipment.
- 02.06 Apply proper cleanup and disposal procedures.
- 02.07 Analyze emergency procedures for an unplanned release of materials.
- 02.08 Transport and dispose of materials safely.
- 02.09 Discuss recommended and prohibited work practices.
- 02.10 Explain new abatement-related techniques and methodologies.
- 02.11 Describe relevant federal, state, and local regulatory requirements, such as those of TSCA Title II, RCRA, EPA, and OSHA.

03.0 IDENTIFY SAFETY HAZARDS AND WAYS TO PROTECT AGAINST THEM--The student will be able to:

- 03.01 Identify and describe the physical characteristics and appearance of hazardous materials used in the insulation industry.
- 03.02 Identify electrical, fire, and explosion hazards.
- 03.03 Describe heat stress and its symptoms and preventions.
- 03.04 Discuss the possible presence of other contaminants and ways to protect against them.
- 03.05 Analyze work sites for hazardous conditions that could cause slips, trips, and falls.
- 03.06 Identify confined spaces where safety hazards may exist.

04.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 04.01 Write logical and understandable statements or phrases to accurately fill out the forms/invoices commonly used in business and industry.
- 04.02 Read and understand the graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 04.03 Read and follow written instructions and listen to and follow oral instructions.
- 04.04 Answer and ask questions coherently and concisely.
- 04.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 04.06 Demonstrate appropriate telephone communication skills.

05.0 APPLY APPROPRIATE MATH SKILLS--The student will be able to:

- 05.01 Add, subtract, multiply, and divide numbers, using fractions, decimals, and whole numbers.
- 05.02 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
- 05.03 Measure tolerances on horizontal and vertical surfaces, using centimeters, feet, and inches.
- 05.04 Determine the purchase price of items, including the applicable sales tax.
- 05.05 Compute federal, state, and local taxes.

06.0 EXPLAIN AND DEMONSTRATE APPROPRIATE FIELD SAFETY RULES AND PROCEDURES--The student will be able to:

- 06.01 Utilize appropriate personal protective equipment (PPE).
- 06.02 Apply first-aid procedures.
- 06.03 Set up warning signs, signals, and barricades.
- 06.04 Identify, select, and operate tools and equipment safety.
- 06.05 Erect and use ladders and scaffolding safely.
- 06.06 Transport and store materials safely and securely.
- 06.07 Follow Occupational Safety and Health Administration (OSHA) and Mining Safety and Health Act (MSHA) rules and regulations.
- 06.08 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and

demonstrate a knowledge of the proper precautions required for handling such materials.

06.09 Describe the proper precautions for handling work-related chemicals and hazardous materials.

06.10 Locate and interpret regulating requirements.

07.0 DEMONSTRATE A KNOWLEDGE OF THE GENERAL APPLICATIONS AND USES OF COMMERCIAL AND INDUSTRIAL INSULATION--The student will be able to:

07.01 Describe the uses of insulation.

07.02 Identify insulation-bonding agents such as tapes and cements.

07.03 Describe the insulation needs of commercial mechanical systems on buildings, such as heating and air-conditioning units.

07.04 Describe the insulation needs of industrial mechanical systems such as boilers, turbines, and heat exchangers.

08.0 APPLY INSULATION THEORY TO JOB NEEDS--The student will be able to:

08.01 Explain the concept and method of heat transfer.

08.02 Identify factors of insulation.

08.03 Analyze moisture effects on insulation materials.

08.04 Identify the cause of vapor and different types of vapor barriers.

09.0 READ AND INTERPRET BLUEPRINTS AND SPECIFICATIONS--The student will be able to:

09.01 Read and interpret job specifications.

09.02 Analyze a plot plan.

09.03 Verify a plan view.

09.04 Determine a proper elevation section.

09.05 Read and interpret an isometric drawing.

09.06 Interpret a blueprint based on various scales.

09.07 Identify column lines.

09.08 Define blueprint symbols.

10.0 ESTIMATE AND ORDER MATERIALS FOR A JOB SITE--The student will be able to:

10.01 Estimate the amount of insulation materials needed for a job site.

10.02 Identify and select accessory materials.

10.03 Order the appropriate insulations and accessory materials for the job site.

10.04 Calculate measurements for insulation.

11.0 APPLY VARIOUS INSULATION MATERIALS--The student will be able to:

11.01 Describe the uses of:

a. fiberglass
b. mineral wool
c. cellular glass
d. polyurethane (rigid)
e. polystyrene (expanded and extended)

f. cabular foam (flexible)
g. calcium silicate
h. expanded perlite
i. ceramic fibers
j. insulating cements

11.02 Install pipe coverings.
11.03 Install insulation to mechanical systems such as block boilers, tanks, flues, and environmental units.
11.04 Describe and install multilayer applications.
11.05 Install board and block materials.
11.06 Apply blanket duct wrap.
11.07 Cut materials with appropriate tools and equipment.

12.0 INSTALL ACCESSORY MATERIALS FOR INSULATION--The student will be able to:

12.01 Apply various adhesives.
12.02 Utilize cement bonding.
12.03 Install fasteners and clips.
12.04 Apply reinforcement materials.
12.05 Install mastics for vapor proofing.
12.06 Install protective jackets.
12.07 Describe the functions and uses of weather barriers.

13.0 PERFORM SPECIALIZED INSULATION ACTIVITIES--The student will be able to:

13.01 Describe the uses of the following:
a. insulated panels
b. cryogenic insulation
c. fire-protection materials
d. acoustical insulation
e. temperature refractory insulation

13.02 Install the following:
a. insulated panels
b. cryogenic insulation
c. fire-protection materials
d. acoustical insulation
e. temperature refractory insulation

13.03 Install removable insulation blankets (pads).
13.04 Apply sprayed, formed, and foam insulations.

14.0 DEMONSTRATE AN UNDERSTANDING OF THE APPROPRIATE BASIC SCIENCE--The student will be able to:

14.01 Explain molecular action as a result of temperature extremes, chemical reaction, and moisture content.
14.02 Draw conclusions or make inferences from data.
14.03 Explain pressure measurement in terms of pounds per square inch (PSI) and inches of mercury.

15.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

15.01 Conduct a job search.
15.02 Secure information about a job.
15.03 Identify documents that may be required for a job application.

15.04 Complete a job-application form correctly.
15.05 Demonstrate competence in job-interview techniques.
15.06 Identify or demonstrate appropriate responses to criticism from an employer, a supervisor, or other employees.
15.07 Identify acceptable work habits.
15.08 Demonstrate a knowledge of how to make job changes appropriately.
15.09 Demonstrate acceptable employee health habits.
15.10 Demonstrate a knowledge of "Florida's Right-to-Know" Law as recorded in the Florida Statutes, Chapter 442.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

16.01 Define "entrepreneurship."
16.02 Describe the importance of entrepreneurship to the American economy.
16.03 List the advantages and disadvantages of business ownership.
16.04 Identify the risks involved in the ownership of a business.
16.05 Identify the necessary personal characteristics of a successful entrepreneur.
16.06 Identify the business skills needed to operate a small business efficiently and effectively.
16.07 Describe the record-keeping requirements of federal, state, and local governments and for legal and insurance purposes.
16.08 Explain the key elements of contract specifications.
16.09 Explain insurance and liability issues, such as contractor issues, worker's compensation, third-party liabilities and defenses, and insurance coverage and exclusions.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Commercial Art
Occupational Area:	Industrial Education
	Secondary
Program Numbers	**8718000**
CIP Number	0648.020301
Grade Level	9-12, 30, 31
Length	6 credits
Certification	COMM ART @7 G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as commercial artists and related workers (34035176). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content will include the following: graphic production, technical art skills, design skills, lettering skills, typography layout and paste-up skills, illustration skills, applied design, air brush skills, and desk-top publishing skills. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

Listed below are the courses that comprise this program when offered at the secondary level:

8718010 - Commercial Art 1
8718020 - Commercial Art 2
8718030 - Commercial Art 3
8718040 - Commercial Art 4
8718050 - Commercial Art 5
8718060 - Commercial Art 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Commercial Art industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment and supplies; paste-ups and mechanicals; typography, lettering, layout, illustration and if equipment is available and time allows photography, development of air brush skills, computer graphics, and desk-top publishing.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such

organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

The outcomes and student performance standards which the handicapped student must master must be specified in each student's Individual Education Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in graphic production skills.
02.0 Demonstrate proficiency in technical art skills.
03.0 Demonstrate proficiency in design skills.
04.0 Demonstrate proficiency in lettering skills.
05.0 Demonstrate proficiency in typography skills.
06.0 Demonstrate proficiency in layout and paste-up skills.
07.0 Demonstrate proficiency in illustration skills.
08.0 Demonstrate proficiency in applied design skills.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate appropriate math skills.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate employability skills.
13.0 Demonstrate an understanding of entrepreneurship.
14.0 Demonstrate proficiency in performing computerized creative support operations.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Commercial Art
Secondary Number: 8718000
Postsecondary Number:

01.0 DEMONSTRATE PROFICIENCY IN GRAPHIC PRODUCTION--The student will be able to:

- 01.01 Define the differences in production processes and estimate relative costs.
- 01.02 Recognize limitations for printing.
- 01.03 Identify and select different printing surfaces.
- 01.04 Identify and select appropriate printing inks.
- 01.05 Identify and select finishing processes.

02.0 DEMONSTRATE PROFICIENCY IN TECHNICAL ART SKILLS--The student will be able to:

- 02.01 Explain care and respect for all tools and equipment.
- 02.02 Make computations for centering, spacing and scaling drawings.
- 02.03 Draw on various types of drafting media.
- 02.04 Interpret information from drawings, prints and sketches.
- 02.05 Draw freehand sketches.
- 02.06 Draw auxiliary views.
- 02.07 Draw a one and two-point perspective.
- 02.08 Make corrections on a drawing.
- 02.09 Draw in ink on a variety of surfaces.
- 02.10 Develop a glossary of technical terms.

03.0 DEMONSTRATE PROFICIENCY IN DESIGN SKILLS--The student will be able to:

- 03.01 Explain proper use and care of tools.
- 03.02 Apply principles and elements of design.
- 03.03 Apply color theory (pigment versus light).
- 03.04 Utilize tones, hues and values.
- 03.05 Sketch designs using pencil and ink.
- 03.06 Paint freehand or within sketched designs using mixed colors or apply colors to produce desired shades.
- 03.07 Apply color for impact (color psychology).
- 03.08 Differentiate between line halftone, duotone and four-color process.
- 03.09 Demonstrate balance in design.
- 03.10 Demonstrate designs with symmetry and asymmetry.
- 03.11 Develop grids for layouts of magazine pages, ads, etc.

04.0 DEMONSTRATE PROFICIENCY IN LETTERING SKILLS--The student will be able to:

- 04.01 Demonstrate use and care of tools, lettering pens, T-squares and triangles.
- 04.02 Identify and select lettering styles.

04.03 Perform and use pen, brush, pencil and LeRoy lettering.
04.04 Utilize guidelines, margins and spacing for layouts.
04.05 Paint or draw precise lettering for reproduction.
04.06 Utilize various types of prepared lettering processes.
04.07 Produce a sign on poster board.
04.08 Determine and select lettering styles for layout sketches.
04.09 Illuminate a certificate.

05.0 DEMONSTRATE AN UNDERSTANDING OF TYPOGRAPHY--The student will be able to:

05.01 Explain proper use, care and cleaning of equipment.
05.02 Identify and select typography materials.
05.03 Define typographic terms, including leading and kerning.
05.04 Identify and select typographic methods.
05.05 Demonstrate the abiĭity to proofread and use proofreaders' marks.
05.06 Explain picas, points and conversion to inches.
05.07 Explain specification of type and copy fitting.

06.0 DEMONSTRATE PROFICIENCY IN LAYOUT AND PASTE-UP--The student will be able to:

06.01 Explain proper use and care of tools.
06.02 Identify parts of a layout.
06.03 Utilize amberlith, rubylith, screens, overlays and register marks.
06.04 Make thumbnail sketch pencil layouts.
06.05 Prepare comprehensives from pencil layouts.
06.06 Prepare camera-ready mechanicals from comprehensives.
06.07 Prepare specific forms of instruction on mechanicals for presentations and for a printer.
06.08 Crop and scale artwork and/or photos for layouts.
06.09 Demonstrate enlarging or reducing with a grid, proportion wheel and other methods.
06.10 Make a color separation with overlays.
06.11 Demonstrate various ruling techniques.
06.12 Demonstrate various ruling techniques.
06.13 Specify the use of halftones or special effects.

07.0 DEMONSTRATE PROFICIENCY IN ILLUSTRATION SKILLS--The student will be able to:

07.01 Explain proper use and care of tools.
07.02 Demonstrate elementary anatomy drawing skills.
07.03 Illustrate using ink, pencil, washes, markers, tempera, watercolor and paints.
07.04 Demonstrate renderings of different textures using the above media.
07.05 Make illustrations using various subjects.

08.0 DEMONSTRATE PROFICIENCY IN APPLIED DESIGN--The student will be able to:

08.01 Locate and identify resource materials and develop a morgue.
08.02 Design logos.

08.03 Design stationery layouts.
08.04 Design a magazine/book cover or record jacket.
08.05 Design an ad campaign that includes newspapers, magazines and billboards.
08.06 Design a greeting card.
08.07 Design a business card.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Identify documents which may be required when applying for a job.
12.04 Complete a job application form correctly.
12.05 Demonstrate competence in job interview techniques.

12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
12.07 Identify and adopt acceptable work habits.
12.08 Demonstrate knowledge of how to make job changes appropriately.
12.09 Demonstrate acceptable employee health habits.
12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.
13.05 Identify the necessary personal characteristics of a successful entrepreneur.
13.06 Identify the business skills needed to operate a small business efficiently and effectively.

14.0 DEMONSTRATE PROFICIENCY IN PERFORMING COMPUTERIZED CREATIVE SUPPORT OPERATIONS--The student will be able to:

14.01 Prepare desk-top publishing equipment for operations.
14.02 Operate desk-top publishing equipment.
14.03 Proofread desk-top copy.
14.04 Modify existing copy utilizing desk-top publishing equipment.
14.05 Prepare multiple-page copy utilizing desk-top publishing equipment.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8718010
Course Title: Commercial Art 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in communication skills and graphic production processes.

01.0 DEMONSTRATE PROFICIENCY IN GRAPHIC PRODUCTION--The student will be able to:

- 01.01 Define the differences in production processes and estimate relative costs.
- 01.02 Recognize limitations for printing.
- 01.03 Identify and select different printing surfaces.
- 01.04 Identify and select appropriate printing inks.
- 01.05 Identify and select finishing processes.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 09.03 Read and follow written and oral instructions.
- 09.04 Answer and ask questions coherently and concisely.
- 09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8718020
Course Title: Commercial Art 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in technical art and design skills.

02.0 DEMONSTRATE PROFICIENCY IN TECHNICAL ART SKILLS--The student will be able to:

- 02.01 Explain care and respect for all tools and equipment.
- 02.02 Make computations for centering, spacing and scaling drawings.
- 02.03 Draw on various types of drafting media.
- 02.04 Interpret information from drawings, prints and sketches.
- 02.05 Draw freehand sketches.
- 02.06 Draw auxiliary views.
- 02.07 Draw a one- and two-point perspective.
- 02.08 Make corrections on a drawing.
- 02.09 Draw in ink on a variety or surfaces.
- 02.10 Develop a glossary of technical terms.

03.0 DEMONSTRATE PROFICIENCY IN DESIGN SKILLS--The student will be able to:

- 03.01 Explain proper use and care of tools.
- 03.02 Apply principles and elements of design.
- 03.03 Apply color theory (pigment versus light).
- 03.04 Utilize tones, hues and values.
- 03.05 Sketch designs using pencil and ink.
- 03.06 Paint freehand or within sketched designs using mixed colors or apply colors to produce desired shades.
- 03.07 Apply color for impact (color psychology).
- 03.08 Differentiate between line halftone, duotone and four-color process.
- 03.09 Demonstrate balance in design.
- 03.10 Demonstrate designs with symmetry and asymmetry.
- 03.11 Develop grids for layouts of magazine pages, ads, etc.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 11.02 Draw conclusions or make inferences from data.
- 11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8718030
Course Title: Commercial Art 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in lettering skills and typography techniques.

04.0 DEMONSTRATE PROFICIENCY IN LETTERING SKILLS--The student will be able to:

- 04.01 Demonstrate use and care of tools, lettering pens, T-squares and triangles.
- 04.02 Identify and select lettering styles.
- 04.03 Perform and use pen, brush, pencil and LeRoy lettering.
- 04.04 Utilize guidelines, margins and spacing for layouts.
- 04.05 Paint or draw precise lettering for reproduction.
- 04.06 Utilize various types of prepared lettering processes.
- 04.07 Produce a sign on poster board.
- 04.08 Determine and select lettering styles for layout sketches.
- 04.09 Illuminate a certificate.

05.0 DEMONSTRATE AN UNDERSTANDING OF TYPOGRAPHY--The student will be able to:

- 05.01 Explain proper use, care and cleaning of equipment.
- 05.02 Identify and select typography materials.
- 05.03 Define typographic terms, including leading and kerning.
- 05.04 Identify and select typographic methods.
- 05.05 Demonstrate the ability to proofread and use proofreaders' marks.
- 05.06 Explain picas, points and conversion to inches.
- 05.07 Explain specification of type and copy fitting.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8718040
Course Title: Commercial Art 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in layout and paste-up techniques and illustration skills.

06.0 DEMONSTRATE PROFICIENCY IN LAYOUT AND PASTE-UP--The student will be able to:

- 06.01 Explain proper use and care of tools.
- 06.02 Identify parts of a layout.
- 06.03 Utilize amberlith, rubylith, screens, overlays and register marks.
- 06.04 Make thumbnail sketch pencil layouts.
- 06.05 Prepare comprehensives from pencil layouts.
- 06.06 Prepare camera-ready mechanicals from comprehensives.
- 06.07 Prepare specific forms of instruction on mechanicals for presentations and for a printer.
- 06.08 Crop and scale artwork and/or photos for layouts.
- 06.09 Demonstrate enlarging or reducing with a grid, proportion wheel and other methods.
- 06.10 Make a color separation with overlays.
- 06.11 Demonstrate various ruling techniques.
- 06.12 Demonstrate various ruling techniques.
- 06.13 Specify the use of halftones or special effects.

07.0 DEMONSTRATE PROFICIENCY IN ILLUSTRATION SKILLS--The student will be able to:

- 07.01 Explain proper use and care of tools.
- 07.02 Demonstrate elementary anatomy drawing skills.
- 07.03 Illustrate using ink, pencil, washes, markers, tempera, watercolor and paints.
- 07.04 Demonstrate renderings of different textures using the above media.
- 07.05 Make illustrations using various subjects.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8718050
Course Title: Commercial Art 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in applied design techniques.

08.0 DEMONSTRATE PROFICIENCY IN APPLIED DESIGN--The student will be able to:

- 08.01 Locate and identify resource materials and develop a morgue.
- 08.02 Design logos.
- 08.03 Design stationery layouts.
- 08.04 Design a magazine/book cover or record jacket.
- 08.05 Design an ad campaign that includes newspapers, magazines and billboards.
- 08.06 Design a greeting card.
- 08.07 Design a business card.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8718060
Course Title: Commercial Art 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in employability skills and entrepreneurship.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Identify documents which may be required when applying for a job.
12.04 Complete a job application form correctly.
12.05 Demonstrate competence in job interview techniques.
12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
12.07 Identify and adopt acceptable work habits.
12.08 Demonstrate knowledge of how to make job changes appropriately.
12.09 Demonstrate acceptable employee health habits.
12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able o:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.
13.05 Identify the necessary personal characteristics of a successful entrepreneur.
13.06 Identify the business skills needed to operate a small business efficiently and effectively.

14.0 DEMONSTRATE PROFICIENCY IN PERFORMING COMPUTERIZED CREATIVE SUPPORT OPERATIONS--The student will be able to:

14.01 Prepare desk-top publishing equipment for operations.
14.02 Operate desk-top publishing equipment.
14.03 Proofread desk-top copy.
14.04 Modify existing copy utilizing desk-top publishing equipment.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Commercial Art Technology
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I480203**
CIP Number	0648.020300
Grade Level	30, 31
Length	1290 hours
Certification	COMM ART @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as artists and related workers (34035176), illustrators 141.061-022), commercial designers (141.081-014). This program also provides supplemental training for persons previously or currently employed in these occupations.

The course content will include the following: basic art skills; lettering skills; preparation of layouts and illustrations; preparation of camera ready paste-up; and development of specialized skills.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Commercial Art industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: lettering signs, layout and design for advertising art, airbrush for illustrations, photo retouching and custom work.

III **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects

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equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 9.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1290 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate basic commercial art knowledge.
02.0 Demonstrate proficiency in graphic production.
03.0 Demonstrate proficiency in technical art skills.
04.0 Demonstrate proficiency in design skills.
05.0 Demonstrate proficiency in lettering skills.
06.0 Demonstrate an understanding of typography.
07.0 Demonstrate proficiency in layout and paste-up.
08.0 Demonstrate proficiency in illustration skills.
09.0 Demonstrate proficiency in applied design.
10.0 Demonstrate proficiency in photostat camera skills.
11.0 Demonstrate proficiency in airbrush skills.
12.0 Demonstrate appropriate communication skills.
13.0 Demonstrate appropriate math skills.
14.0 Demonstrate appropriate understanding basic science.
15.0 Demonstrate employability skills.
16.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Commercial Art Technology
Secondary Number:
Postsecondary Number: I480203

01.0 DEMONSTRATE BASIC COMMERCIAL ART KNOWLEDGE--The student will be able to:

- 01.01 Take notes, listen and comply with instructions.
- 01.02 Read instructions thoroughly.
- 01.03 Request clarification of instructions (ask questions).
- 01.04 Relay instructions to others orally and in writing.
- 01.05 Define and explain commercial art terms.
- 01.06 Document job tasks, costs and maintain records.
- 01.07 Make project presentations.
- 01.08 Interact with the employer, fellow employees and customers.

02.0 DEMONSTRATE PROFICIENCY IN GRAPHIC PRODUCTION--The student will be able to:

- 02.01 Define the differences in production processes and estimate relative costs.
- 02.02 Recognize limitations for printing.
- 02.03 Identify and select different printing surfaces.
- 02.04 Identify and select appropriate printing inks.
- 02.05 Identify and select finishing processes.
- 02.06 Identify standard industry material sizes.
- 02.07 Specify types of folds.

03.0 DEMONSTRATE PROFICIENCY IN TECHNICAL ART SKILLS--The student will be able to:

- 03.01 Explain care and respect for all tools and equipment.
- 03.02 Make computations for centering, spacing and scaling drawings.
- 03.03 Draw on various types of drafting media.
- 03.04 Interpret information from drawings, prints and sketches.
- 03.05 Draw freehand sketches.
- 03.06 Draw auxiliary views.
- 03.07 Draw a one and two point perspective.
- 03.08 Make corrections on a drawing.
- 03.09 Draw in ink on a variety of surfaces.
- 03.10 Develop a glossary of technical terms.
- 03.11 Analyze an object to determine size and shape.
- 03.12 Draw an oblique drawing.
- 03.13 Draw an isometric drawing.
- 03.14 Read and interpret technical charts, graphs and diagrams.
- 03.15 Evaluate a drawing.
- 03.16 Make an orthographic drawing using a computer-assisted drafting (CAD) system as an individual or team member.
- 03.17 Make a print on a plotter.

04.0 DEMONSTRATE PROFICIENCY IN DESIGN SKILLS--The student will be able to:

04.01 Explain proper use and care of tools.
04.02 Apply principles and elements of design.
04.03 Apply color theory (pigment versus light).
04.04 Utilize tones, hues and values.
04.05 Sketch designs using pencil and ink.
04.06 Paint freehand or within sketched designs using mixed colors or apply colors to produce desired shades.
04.07 Apply color for impact (color psychology).
04.08 Differentiate between line halftone, duotone and four-color process.
04.09 Demonstrate balance in design.
04.10 Demonstrate designs with symmetry and asymmetry.
04.11 Develop grids for layouts of magazine pages, ads, etc.
04.12 Paint decorative freehand designs and objects.
04.13 Use palette knife or brush to mix colors.
04.14 Create designs by stripping.
04.15 Demonstrate harmony and contrast of line and shape.
04.16 Demonstrate harmony and contrast of color and tone.
04.17 Demonstrate harmony and contrast of proportion.
04.18 Demonstrate harmony and contrast of texture pattern.
04.19 Demonstrate harmony and contrast of motion.
04.20 Indicate style appropriate to desired impact.
04.21 Make a collage.

05.0 DEMONSTRATE PROFICIENCY IN LETTERING SKILLS--The student will be able to:

05.01 Demonstrate use and care of tools, lettering pens, t-squares and triangles.
05.02 Identify and select lettering styles.
05.03 Perform and use pen, brush, pencil and LeRoy lettering.
05.04 Utilize guidelines, margins and spacing for layouts.
05.05 Paint or draw precise lettering for reproduction.
05.06 Utilize various types of prepared lettering processes.
05.07 Produce a sign on poster board.
05.08 Determine and select lettering styles for layout sketches.
05.09 Illuminate a certificate.

06.0 DEMONSTRATE AN UNDERSTANDING OF TYPOGRAPHY--The student will be able to:

06.01 Explain proper use, care and cleaning of equipment.
06.02 Identify and select typography materials.
06.03 Define typographic terms, including leading and kerning.
06.04 Identify and select typographic methods.
06.05 Demonstrate the ability to proofread and use proofreaders' marks.
06.06 Explain picas, points and conversion to inches.
06.07 Explain specification of type and copy fitting.
06.08 Identify and select typographic styles.
06.09 Define basic letter structures.
06.10 Demonstrate mixing of families of type.

07.0 DEMONSTRATE PROFICIENCY IN LAYOUT AND PASTE-UP--The student will be able to:

- 07.01 Explain proper use and care of tools.
- 07.02 Identify parts of a layout.
- 07.03 Utilize amberlith, rubylith, screens, overlays and register marks.
- 07.04 Make thumbnail sketch pencil layouts.
- 07.05 Prepare comprehensives from pencil layouts.
- 07.06 Prepare camera-ready mechanicals from comprehensives.
- 07.07 Prepare specific forms of instruction on mechanicals for presentations and for a printer.
- 07.08 Crop and scale artwork ardor photos for layouts.
- 07.09 Demonstrate enlarging or reducing with a grid, proportion wheel and other methods.
- 07.10 Make a color separation with overlays.
- 07.11 Demonstrate various ruling techniques.
- 07.12 Demonstrate the uses of different adhesives.
- 07.13 Specify the use of halftones or special effects.
- 07.14 Explain layout and color trends.

08.0 DEMONSTRATE PROFICIENCY IN ILLUSTRATION SKILLS--The student will be able to:

- 08.01 Explain proper use and care of tools.
- 08.02 Demonstrate elementary anatomy drawing skills.
- 08.03 Illustrate using ink, pencil, washes, markers, tempera, watercolor and paints.
- 08.04 Demonstrate renderings of different textures using the above media.
- 08.05 Make illustrations using various subjects.
- 08.06 Make a montage illustration.
- 08.07 Draw a cartoon.

09.0 DEMONSTRATE PROFICIENCY IN APPLIED DESIGN--The student will be able to:

- 09.01 Locate and identify resource materials and develop a morgue.
- 09.02 Design logos.
- 09.03 Design stationery layouts.
- 09.04 Design a magazine/book cover or record jacket.
- 09.05 Design an ad campaign that includes newspapers, magazines and billboards.
- 09.06 Design a greeting card.
- 09.07 Design a business card.
- 09.08 Apply advertising psychology.
- 09.09 Produce an industrial brochure.
- 09.10 Design a consumer brochure.
- 09.11 Construct a package design.
- 09.12 Produce TV story boards.
- 09.13 Develop a square and half-drop repeat design.
- 09.14 Produce computer-assisted artwork. (optional)

10.0 DEMONSTRATE PROFICIENCY IN PHOTOSTAT CAMERA SKILLS--The student will be able to:

10.01 Explain proper use and care of equipment, chemicals and supplies.
10.02 Identify parts of a camera.
10.03 Define photography terms.
10.04 Make negative and positive line shots on paper and film.
10.05 Make halftones.
10.06 Demonstrate enlarging and reducing.
10.07 Demonstrate stripping.
10.08 Demonstrate opaquing.

11.0 DEMONSTRATE PROFICIENCY IN AIRBRUSH SKILLS--The student will be able to:

11.01 Explain proper use and care of tools.
11.02 Identify airbrush parts.
11.03 Perform airbrush exercises: dots, lines and graded shadings.
11.04 Select appropriate surfaces and painting materials.
11.05 Define the use of masking materials.
11.06 Airbrush a painting using masks or brushes.
11.07 Airbrush geometric shapes.
11.08 Airbrush freehand painting.
11.09 Airbrush an illustration of a product.
11.10 Retouch photos.

12.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

12.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
12.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
12.03 Read and follow written and oral instructions.
12.04 Answer and ask questions coherently and concisely.
12.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
12.06 Demonstrate appropriate telephone/communication skills.

13.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

13.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
13.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
13.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
13.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
13.05 Demonstrate an understanding of federal, state and local taxes and their computation.

14.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

14.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

14.02 Draw conclusions or make inferences from data.

14.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

14.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

15.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

15.01 Conduct a job search.

15.02 Secure information about a job.

15.03 Identify documents which may be required when applying for a job.

15.04 Complete a job application form correctly.

15.05 Demonstrate competence in job interview techniques.

15.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

15.07 Identify and adopt acceptable work habits.

15.08 Demonstrate knowledge of how to make job changes appropriately.

15.09 Demonstrate acceptable employee health habits.

15.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

16.01 Define entrepreneurship.

16.02 Describe the importance of entrepreneurship to the American economy.

16.03 List the advantages and disadvantages of business ownership.

16.04 Identify the risks involved in ownership of a business.

16.05 Identify the necessary personal characteristics of a successful entrepreneur.

16.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Commercial Business Machine Maintenance
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I470102**
CIP Number	0647.010200
Grade Level	30, 31
Length	1800 hours
Certification	BUS MACH @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as office machine servicers (85926659), (633.281-018), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and the maintenance and repair of a variety of office machines as typewriters, dictation machines, calculators, data processing equipment, duplicating machines, and mailing machines.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Business Machine Maintenance industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in diagnostic/ troubleshooting technique, use of test equipment, and applied mechanics, and electrical/electronic theory as they relate to the repair of business machines.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 10.0, Language 9.0, Reading 10.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1800 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in laboratory practices.
02.0 Demonstrate proficiency in DC circuits.
03.0 Demonstrate proficiency in AC circuits.
04.0 Demonstrate proficiency in solid state devices.
05.0 Demonstrate proficiency in analog circuits.
06.0 Demonstrate proficiency in digital circuits.
07.0 Demonstrate proficiency in microprocessor circuits.
08.0 Demonstrate proficiency in technical recording and reporting.
09.0 Troubleshoot, maintain, and repair electronic typewriters.
10.0 Troubleshoot, maintain, and repair electromechanical typewriters.
11.0 Troubleshoot, maintain, and repair electronic printing calculators.
12.0 Troubleshoot, maintain, and repair selenium drum process (SDP) copy equipment.
13.0 Troubleshoot, maintain, and repair cadmium sulfide (CDS) copy equipment.
14.0 Troubleshoot, maintain, and repair word processing equipment.
15.0 Demonstrate appropriate communication skills.
16.0 Demonstrate appropriate math skills.
17.0 Demonstrate appropriate understanding of basic science.
18.0 Demonstrate employability skills.
19.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Commercial Business Machine Maintenance
Secondary Number:
Postsecondary Number: I470102

01.0 DEMONSTRATE PROFICIENCY IN LABORATORY PRACTICES--The student will be able to:

- 01.01 Apply proper OSHA safety standards.
- 01.02 Make electrical connections.
- 01.03 Identify and use hand tools properly.
- 01.04 Identify and use power tools properly.
- 01.05 Demonstrate acceptable soldering and desoldering techniques.

02.0 DEMONSTRATE PROFICIENCY IN DC CIRCUITS--The student will be able to:

- 02.01 Solve algebraic problems to include exponentials (prerequisite to DC).
- 02.02 Solve problems in electronic units utilizing metric prefixes.
- 02.03 Relate electricity to the nature of matter.
- 02.04 Identify sources of electricity.
- 02.05 Define voltage, current, resistance, power and energy.
- 02.06 Apply ohm's law and power formula.
- 02.07 Read and interpret color codes and symbols to identify electrical components and values.
- 02.08 Measure properties of a circuit using VOM and DVM meters and oscilloscopes.
- 02.09 Compute and measure conductance and resistance of conductors and insulators.
- 02.10 Apply ohm's law to series circuits.
- 02.11 Construct and verify operation and series circuits.
- 02.12 Analyze and troubleshoot series circuits.
- 02.13 Apply Ohm's law to parallel circuits.
- 02.14 Construct and verify the operation of parallel circuits.
- 02.15 Analyze and troubleshoot parallel circuits.
- 02.16 Apply Ohm's law to series-parallel/parallel-series circuits.
- 02.17 Construct and verify the operation of series-parallel/parallel-series and bridge circuits.
- 02.18 Troubleshoot series-parallel/parallel-series and bridge circuits.
- 02.19 Identify and define voltage divider circuits (loaded and unloaded).
- 02.20 Construct and verify the operation of voltage divider circuits (loaded and unloaded).
- 02.21 Analyze and troubleshoot voltage divider circuits (loaded and unloaded).
- 02.22 Apply maximum power transfer theory.
- 02.23 Construct and verify the operation of DC circuits that demonstrate the maximum power transfer theory.
- 02.24 Describe magnetic properties and circuits and devices.

02.25 Determine and physical and electrical characteristics of capacitors and inductors.
02.26 Define RC and RL time constants and classify the output of differentiators and integrators.
02.27 Set up and operate power supplies for DC circuits.

03.0 DEMONSTRATE PROFICIENCY IN AC CIRCUITS--The student will be able to:

03.01 Solve basic trigonometric problems as applicable to electronics (prerequisite to AC).
03.02 Identify properties of an AC signal.
03.03 Identify AC sources.
03.04 Analyze and measure AC signals utilizing VOM, DVM, oscilloscope, frequency counter, and function generator.
03.05 Define the characteristics of AC capacitive circuits.
03.06 Construct and verify the operation of AC capacitive circuits.
03.07 Analyze and troubleshoot AC capacitive circuits.
03.08 Define the characteristics of AC inductive circuits.
03.09 Construct and verify the operation of AC inductive circuits.
03.10 Analyze and troubleshoot AC inductive circuits.
03.11 Define and apply the principles of transformers to AC.
03.12 Construct and verify the operation of AC circuits utilizing transformers.
03.13 Analyze and troubleshoot AC circuits utilizing transformers.
03.14 Construct and verify the operation of differentiators and integrators to determine RC and RL time constants.
03.15 Analyze and troubleshoot differentiator and integrator circuits.
03.16 Define the characteristics of RLC circuits (series, parallel, and complex).
03.17 Construct and verify the operation of RLC circuits (series, parallel, and complex).
03.18 Define the characteristics of series and parallel resonant circuits.
03.19 Construct and verify the operation of series and parallel resonant circuits.
03.20 Analyze and troubleshoot RC, RL, and RLC circuits.
03.21 Define the characteristics of frequency selective filter circuits.
03.22 Construct and verify the operation of frequency selective filter circuits.
03.23 Analyze and troubleshoot frequency selective filter circuits.
03.24 Define the characteristics of polyphase circuits.
03.25 Define basic motor theory and operation.
03.26 Define basic generator theory and operation.
03.27 Set up and operate power supplies for AC circuits.
03.28 Analyze and measure power in AC circuits.
03.29 Set up and operate capacitor/inductor analyzers for AC circuits.

04.0 DEMONSTRATE PROFICIENCY IN SOLID-STATE DEVICES--The student will be able to:

04.01 Identify and define properties of semiconductor materials.

04.02 Identify and define operating characteristics and applications of pn junction diodes.
04.03 Identify and define operating characteristics and applications of special diodes.
04.04 Construct diode circuits.
04.05 Analyze and troubleshoot diode circuits.
04.06 Identify and define operating characteristics and applications of bipolar transistors.
04.07 Identify and define operating characteristics and applications of field effect transistors (FET's).
04.08 Identify and define operating characteristics and applications of single-stage amplifiers.
04.09 Construct single-stage amplifiers.
04.10 Analyze and troubleshoot single-stage amplifiers.
04.11 Construct thyristor circuitry.
04.12 Analyze and troubleshoot thyristor circuitry.
04.13 Set up and operate a VOM for solid-state devices.
04.14 Set up and operate a DVM for solid-state devices.
04.15 Set up and operate power supplies for sold-state devices.
04.16 Set up and operate oscilloscopes for solid-state devices.
04.17 Set up and operate function generators for solid-state devices.
04.18 Set up and operate capacitor/inductor analyzers for solid-state devices.
04.19 Set up and operate curve tracers.
04.20 Set up and operate transistor testers.

05.0 DEMONSTRATE PROFICIENCY IN ANALOG CIRCUITS--The student will be able to:

05.01 Identify and define operational characteristics and applications of multistage amplifiers.
05.02 Construct multistage amplifiers.
05.03 Analyze and troubleshoot multistage amplifiers.
05.04 Identify and define operating characteristics and applications of linear integrated circuits.
05.05 Identify and define operating characteristics and applications of basic power supplies and filters.
05.06 Construct basic power supplies and filters.
05.07 Troubleshoot basic power supplies and filters.
05.08 Identify and define operating characteristics and applications of differential and operational amplifiers.
05.09 Construct differential and operational amplifier circuits.
05.10 Analyze and troubleshoot differential and operational amplifier circuits.
05.11 Identify and define operating characteristics of audio power amplifiers.
05.12 Construct audio power amplifiers.
05.13 Analyze and troubleshoot audio power amplifiers.
05.14 Identify and define operating characteristics and applications of power supply regulator circuits.
05.15 Construct power supply regulator circuits.
05.16 Analyze and troubleshoot power supply regulator circuits.
05.17 Identify and define operating characteristics and applications of active filters.
05.18 Construct active filter circuits.

05.19 Analyze and troubleshoot active filter circuits.
05.20 Identify and define operating characteristics and applications of sinusoidal and nonsinusoidal oscillator circuits.
05.21 Construct oscillator circuits.
05.22 Analyze and troubleshoot oscillator circuits.
05.23 Identify and define operating characteristics and applications of motor phase-shift control circuits (single-phase and multiphase).
05.24 Identify and define operating characteristics and applications of cathode ray tubes.
05.25 Identify and define operating characteristics and applications of optoelectronic devices.
05.26 Set up and operate measuring instruments for analog circuits.

06.0 DEMONSTRATE PROFICIENCY IN DIGITAL CIRCUITS--The student will be able to:

06.01 Define and apply numbering systems to codes and arithmetic operations.
06.02 Analyze/minimize logic circuits using Boolean operations.
06.03 Set up and operate logic probes for digital circuits.
06.04 Set up and operate power supplies for digital circuits and solve power distribution and noise problems.
06.05 Set up and operate pulsers for digital circuits.
06.06 Set up and operate oscilloscopes for digital circuits.
06.07 Set up and operate logic analyzers for digital circuits.
06.08 Set up and operate pulse generators for digital circuits.
06.09 Identify types of logic gates and their truth tables.
06.10 Construct combinational logic circuits using integrated circuits.
06.11 Troubleshoot logic circuits.
06.12 Analyze types of flip-flops and their truth tables.
06.13 Construct flip-flops using integrated circuits.
06.14 Troubleshoot flip-flops.
06.15 Identify, define, and measure characteristics of integrated circuit (IC) logic families.
06.16 Identify types of registers and counters.
06.17 Construct registers and counters using flip-flops and logic gates.
06.18 Troubleshoot registers and counters.
06.19 Analyze clock and timing circuits.
06.20 Construct clock and timing circuits.
06.21 Troubleshoot clock and timing circuits.
06.22 Identify types of arithmetic-logic circuits.
06.23 Construct arithmetic-logic circuits.
06.24 Troubleshoot arithmetic-logic circuits.
06.25 Identify types of encoding and decoding devices.
06.26 Construct encoders and decoders.
06.27 Troubleshoot encoders and decoders.
06.28 Identify types of multiplexer and demultiplexer circuits.
06.29 Construct multiplexer and demultiplexer circuits using integrated circuits.
06.30 Troubleshoot multiplexer and demultiplexer circuits.
06.31 Identify types of memory circuits.

06.32 Relate the uses of digital-to-analog and analog-to-digital conversions.
06.33 Construct digital-to-analog and analog-to-digital circuits.
06.34 Troubleshoot digital-to-analog and analog-to-digital circuits.
06.35 Identify types of digital displays.
06.36 Construct digital display circuits.
06.37 Troubleshoot digital display circuits.

07.0 DEMONSTRATE PROFICIENCY IN MICROPROCESSOR SYSTEMS--The student will be able to:

07.01 Identify CPU (Architecture) building blocks and their uses.
07.02 Analyze BUS concepts.
07.03 Analyze various memory schemes.
07.04 Use memory devices in circuits.
07.05 Troubleshoot memory-device circuits.
07.06 Set up and operate oscilloscopes for microprocessor systems.
07.07 Set up and operate logic/data analyzers for troubleshooting microprocessor systems.
07.08 Identify types of input and output devices and peripherals.
07.09 Interface input and output ports to peripherals.
07.10 Analyze and troubleshoot input and output ports.
07.11 Execute computer instruction sets.

08.0 DEMONSTRATE PROFICIENCY IN TECHNICAL RECORDING AND REPORTING--The student will be able to:

08.01 Draw and interpret electronic schematics.
08.02 Record data and design curves and graphs.
08.03 Write reports and make oral presentations.
08.04 Maintain test logs.
08.05 Make equipment-failure reports.
08.06 Specify and requisition simply electronic components.
08.07 Compose technical letters and memoranda.
08.08 Write formal reports of laboratory experiences.
08.09 Draft preventive maintenance and calibration procedures.

09.0 TROUBLESHOOT, MAINTAIN AND REPAIR ELECTRONIC TYPEWRITERS--The student will be able to:

09.01 Read and interpret schematic and block diagrams of electronic typewriters.
09.02 Determine the defective status of keyboards.
09.03 Troubleshoot keyboards.
09.04 Remove and replace keyboards or components.
09.05 Perform operating systems check and make minor adjustments to keyboards.
09.06 Perform preventive maintenance.
09.07 Determine the defective status of logic boards.
09.08 Troubleshoot logic boards.
09.09 Remove and replace logic boards or components.
09.10 Perform operating systems check and make minor adjustments to logic boards.
09.11 Perform preventive maintenance on logic boards.

09.12 Determine the defective status of printing carriers.
09.13 Troubleshoot printing carriers.
09.14 Remove and replace printing carriers or components.
09.15 Perform operating systems check and make minor adjustments to printing carriers.
09.16 Perform preventive maintenance on printing carriers.
09.17 Determine the defective status of power supplies.
09.18 Troubleshoot power supplies.
09.19 Remove and replace power supplies or components.
09.20 Perform operating systems check and make minor adjustments to power supplies.
09.21 Perform preventive maintenance on power supplies.

10.0 TROUBLESHOOT, MAINTAIN AND REPAIR ELECTROMECHANICAL TYPEWRITERS--The student will be able to:

10.01 Read and interpret schematic and block diagrams of electromechanical typewriters.
10.02 Determine the defective status of escapement mechanisms.
10.03 Troubleshoot escapement mechanisms.
10.04 Remove and replace escapement mechanisms or components.
10.05 Perform operating systems check and make minor adjustments to escapement mechanisms.
10.06 Perform preventive maintenance on escapement mechanisms.
10.07 Determine the defective status of keyboards.
10.08 Troubleshoot keyboards.
10.09 Remove and replace keyboards or components.
10.10 Perform operating systems check and make minor adjustments to keyboards.
10.11 Perform preventive maintenance on keyboards.
10.12 Determine the defective status of printing carriers.
10.13 Troubleshoot printing carriers.
10.14 Remove and replace printing carriers or components.
10.15 Perform operating systems check and make minor adjustments to printing carriers.
10.16 Perform preventive maintenance on printing carriers.
10.17 Determine the defective status of cycle clutch drives including motor.
10.18 Troubleshoot cycle clutch drives including motor.
10.19 Remove and replace cycle clutch drives including motor or components.
10.20 Perform operating systems check and make minor adjustments to cycle clutch drives including motor.
10.21 Perform preventive maintenance on cycle clutch drives including motor.
10.22 Determine the defective status of OP-CAM shafts.
10.23 Troubleshoot OP-CAM shafts.
10.24 Remove and replace OP-CAM shafts or components.
10.25 Perform operating systems check and make minor adjustments to OP-CAM shafts.
10.26 Perform preventive maintenance on OP-CAM shafts.

11.0 TROUBLESHOOT, MAINTAIN AND REPAIR ELECTRONIC PRINTING CALCULATORS--The student will be able to:

11.01 Read and interpret schematic and block diagrams on electronic printing calculators.
11.02 Determine the defective status of power supplies.
11.03 Troubleshoot power supplies.
11.04 Remove and replace power supplies or components.
11.05 Perform operating systems check and make minor adjustments to power supplies.
11.06 Perform preventive maintenance on power supplies.
11.07 Determine defective status of printing carriers.
11.08 Troubleshoot printing carriers.
11.09 Remove and replace printing carriers or components.
11.10 Perform operating systems check and make minor adjustments to printing carriers.
11.11 Perform preventive maintenance on printing carriers.
11.12 Determine defective status of logic boards.
11.13 Troubleshoot logic boards.
11.14 Remove and replace logic boards or components.
11.15 Perform operating systems check and make minor adjustments to logic boards.
11.16 Perform preventive maintenance on logic boards.
11.17 Determine defective status of keyboards.
11.18 Troubleshoot keyboards.
11.19 Remove and replace keyboards or components.
11.20 Perform operating systems check and make minor adjustments to keyboards.
11.21 Perform preventive maintenance on keyboards.

12.0 TROUBLESHOOT, MAINTAIN AND REPAIR SELENIUM DRUM PROCESS (SDP) COPY EQUIPMENT--The student will be able to:

12.01 Read and interpret schematic and block diagrams on SDP copy equipment.
12.02 Determine the defective status of power supplies.
12.03 Troubleshoot power supplies.
12.04 Remove and replace power supplies or components.
12.05 Perform operating systems check and make minor adjustments to power supplies.
12.06 Perform preventive maintenance on power supplies.
12.07 Determine the defective status of logic boards.
12.08 Troubleshoot logic boards.
12.09 Remove and replace logic boards or components.
12.10 Perform operating systems check and make minor adjustments to logic boards.
12.11 Perform preventive maintenance on logic boards.
12.12 Determine the defective status of optic systems.
12.13 Troubleshoot optic systems.
12.14 Remove and replace optic systems or components.
12.15 Perform operating systems check and make minor adjustments to optic systems.
12.16 Perform preventive maintenance on optic systems.
12.17 Determine the defective status of fusing systems.
12.18 Troubleshoot fusing systems.
12.19 Remove and replace fusing systems or components.

12.20 Perform operating systems check and make minor adjustments to fusing system.
12.21 Perform preventive maintenance on fusing systems.

13.0 TROUBLESHOOT, MAINTAIN AND REPAIR CADMIUM SULFIDE (CDS) COPY EQUIPMENT--The student will be able to:

13.01 Read and interpret schematic and block diagrams on CDS process copy equipment.
13.02 Determine the defective status of power supplies.
13.03 Troubleshoot power supplies.
13.04 Remove and replace power supplies or components.
13.05 Perform operating systems check and make minor adjustments to power supplies.
13.06 Perform preventive maintenance on power supplies.
13.07 Determine the defective status of logic boards.
13.08 Troubleshoot logic boards.
13.09 Remove and replace logic boards and components.
13.10 Perform operating systems check and make minor adjustments to logic boards.
13.11 Perform preventive maintenance on logic boards.
13.12 Determine the defective status of optic systems.
13.13 Troubleshoot optic systems.
13.14 Remove and replace optic systems or components.
13.15 Perform operating systems check and make minor adjustments to optic systems.
13.16 Perform preventive maintenance on optic systems.
13.17 Determine the defective status of fusing systems.
13.18 Troubleshoot fusing systems.
13.19 Remove and replace fusing systems or components.
13.20 Perform operating systems check and make minor adjustments to fusing systems.
13.21 Perform preventive maintenance on fusing systems.

14.0 TROUBLESHOOT, MAINTAIN AND REPAIR WORD PROCESSING EQUIPMENT--The student will be able to:

14.01 Read and interpret schematic and block diagrams of microcomputers (word processing equipment).
14.02 Determine the defective status of systems software.
14.03 Troubleshoot system software.
14.04 Remove and replace system software or components.
14.05 Perform operating systems check and make minor adjustments to system software.
14.06 Perform preventive maintenance on systems software.
14.07 Determine the defective status of power supplies.
14.08 Troubleshoot power supplies.
14.09 Remove and replace power supplies or components.
14.10 Perform operating systems check and make minor adjustments to power supplies.
14.11 Perform preventive maintenance on power supplies.
14.12 Determine the defective status of daisy wheel printing.
14.13 Troubleshoot daisy wheel printers.
14.14 Remove and replace daisy wheel printers or components.

14.15 Perform operating systems check and make minor adjustments to daisy wheel printers.
14.16 Perform preventive maintenance on daisy wheel printers.
14.17 Determine the defective status of dot matrix printers.
14.18 Troubleshoot dot matrix printers.
14.19 Remove and replace dot matrix printers and components.
14.20 Perform operating systems check and make minor adjustments to dot matrix printers.
14.21 Perform preventive maintenance on dot matrix printers.
14.22 Determine the defective status of logic boards.
14.23 Troubleshoot logic boards.
14.24 Remove and replace logic boards or components.
14.25 Perform operating systems check and make minor adjustments to logic boards or components.
14.26 Perform preventive maintenance on logic boards.
14.27 Determine the defective status of keyboards.
14.28 Troubleshoot keyboards.
14.29 Remove and replace keyboards or components.
14.30 Perform operating systems check and make minor adjustments to keyboards.
14.31 Perform preventive maintenance on keyboards.
14.32 Determine the defective status of display/CRT terminals.
14.33 Troubleshoot display/CRT terminals.
14.34 Remove and replace display/CRT terminals or components.
14.35 Perform operating systems check and make minor adjustments to display/CRT terminals.
14.36 Perform preventive maintenance on display/CRT terminals.
14.37 Determine the defective status of disc drives.
14.38 Troubleshoot disc drives.
14.39 Remove and replace disc drives or components.
14.40 Perform operating systems check and make minor adjustments to disc drives.
14.41 Perform preventive maintenance on disc drives.

15.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

15.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
15.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
15.03 Read and follow written and oral instructions.
15.04 Answer and ask questions coherently and concisely.
15.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
15.06 Demonstrate appropriate telephone/communication skills.

16.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

16.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
16.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

16.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

16.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

16.05 Demonstrate an understanding of federal, state and local taxes and their computation.

17.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

17.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

17.02 Draw conclusions or make inferences from data.

17.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

17.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct a job search.

18.02 Secure information about a job.

18.03 Identify documents which may be required when applying for a job interview.

18.04 Complete a job application form correctly.

18.05 Demonstrate competence in job interview techniques.

18.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

18.07 Identify acceptable work habits.

18.08 Demonstrate knowledge of how to make job changes appropriately.

18.09 Demonstrate acceptable employee health habits.

18.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

19.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

19.01 Define entrepreneurship.

19.02 Describe the importance of entrepreneurship to the American economy.

19.03 List the advantages and disadvantages of business ownership.

19.04 Identify the risks involved in ownership of a business.

19.05 Identify the necessary personal characteristics of a successful entrepreneur.

19.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Commercial Fishing
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	N/A

	Secondary	PSAV
Program Numbers	**8751200**	**I490303**
CIP Number	0649.030300	0649.030300
Grade Level	9-12, 30, 31	30, 31
Length	5 Credits	750 Hours
Certification	COMM FISH @7 G	COMM FISH @7 G
Facility Code	245	245
VSO	VICA	VICA
Coop Method	Yes	Yes
Apprenticeship	No	No

I. **PURPOSE**: The purpose of this program is to prepare students for initial employment an officer or fishing vessel captain (77002516), or to provide supplemental training for persons previously or currently employed in these occupations.

The plan of instruction prepares individuals for crew duties on seagoing boats, barges and ships. Included are boat operation, fishing operations, cleaning and preservation, loading and unloading and emergency procedures.

The content should include, but not be limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, crew duties on seagoing boats, trailers, and small ships. Included is vessel operation and maintenance, vessel navigation, vessel handling, shrimp and net fishing, pot and line fishing, and galley operation/food preparation.

Listed below are the courses that comprise this program when offered at the secondary level:

8751210 - Commercial Fishing 1
8751220 - Commercial Fishing 2
8751230 - Commercial Fishing 3
8751240 - Commercial Fishing 4
8751250 - Commercial Fishing 5

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Fishing industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Laboratory and onboard activities are an integral part of this program and provide instruction in the safe and

efficient operation of commercial watercraft and related systems. Emphasis is placed on vessel operations and fishing techniques.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

When a student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards which the student must master to earn credit must be specified in the student's Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 9.0, Language 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

When this program is offered at the postsecondary level it may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 750 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
OFFICER OR FISHING VESSEL CAPTAIN - OES Code 77002516

01.0 Unlock and get a vessel underway.
02.0 Dock a vessel.
03.0 Operate a vessel at sea.
04.0 Maneuver around offshore structures.
05.0 Anchor vessel.

06.0 Manage and perform cargo handling duties.
07.0 Perform shrimp boat deckhand duties.
08.0 Perform net fisher duties.
09.0 Perform pot fisher duties.
10.0 Perform line fisher duties.
11.0 Bring vessel into port.
12.0 Perform crew operational and maintenance duties aboard a vessel in port.
13.0 Prepare meals aboard vessel.
14.0 Plan and perform emergency procedures.
15.0 Demonstrate appropriate communication skills.
16.0 Demonstrate appropriate math skills.
17.0 Demonstrate appropriate understanding of basic science.
18.0 Demonstrate employability skills.
19.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Commercial Fishing
Secondary Number: 8751200
Postsecondary Number: I490303

OCCUPATIONAL COMPLETION POINT - DATA CODE A
OFFICER OR FISHING VESSEL CAPTAIN - OES Code 77002516

01.0 UNLOCK AND GET VESSEL UNDERWAY--The student will be able to:

01.01 Bleed air compressor of water.
01.02 Check and maintain batteries.
01.03 Measure fuel in day tank.
01.04 Maintain proper level of coolant in expansion tank.
01.05 Determine if all navigation lights are functioning.
01.06 Tighten engine mounts.
01.07 Inspect water level indicators for cleanliness.
01.08 Test marine radio equipment.
01.09 Inspect antenna for physical damage.
01.10 Determine if hydraulic steering equipment is free of air and water.
01.11 Inspect fire-fighting equipment for excessive wear, proper location, and prescribed type.
01.12 Inspect buoyant apparatus for excessive wear, proper location and prescribed type.
01.13 Determine that rudder stuffing box is functioning properly.
01.14 Tighten propeller stuffing box.
01.15 Inspect vessel for fuel leakage.
01.16 Prepare list of equipment to be checked for oil leakage.
01.17 Determine if proper voltage is being generated.
01.18 Maneuver vessel from birth into navigable waterway.
01.19 Pump out bilges.
01.20 Secure loose deck equipment.
01.21 Secure watertight doors, hatches, vents and skylights.

02.0 DOCK A VESSEL--The student will be able to:

02.01 Assign crew members positions for mooring vessel.
02.02 Cast off vessel's mooring lines while remaining on dock.
02.03 Cast off vessel's mooring lines while remaining aboard vessel.
02.04 Tie various knots used in maritime operations.
02.05 Maneuver vessel to dock.
02.06 Release towing gear aboard towing vessel and barges.
02.07 Secure mooring lines to dock.
02.08 Secure mooring lines to vessel.
02.09 Secure engine room.
02.10 Secure propeller shaft.
02.11 Inspect engine room equipment for proper maintenance and safety.
02.12 Correct nautical chart prior to departure.
02.13 Prepare vessel to take on fuel and lube oil.

02.14 Prepare to take on water aboard vessel.
02.15 Splice eye into line.

03.0 OPERATE VESSEL AT SEA--The student will be able to:

03.01 Act as vessel's lookout.
03.02 Determine if electrical connections and outlets are tight and dry.
03.03 Determine if electrical outlets have proper voltage.
03.04 Change air filters on engines.
03.05 Change oil and fuel filters on engines.
03.06 Change oil in engines.
03.07 Demonstrate knowledge of the rules of the road in operating a vessel.
03.08 Determine time of arrival when current effect is known.
03.09 Determine time of arrival when current effect is unknown.
03.10 Display day or night signals for different towing situations.
03.11 Inspect heaving lines, mooring lines, and fixed and running rigging for excessive wear.
03.12 Clean engine room and its equipment.
03.13 Determine Greenwich Mean Time (GMT) by using vessel's chronometer.
03.14 Determine position by using Omega navigation system.
03.15 Steer a course by using the magnetic compass.
03.16 Operate radar equipment.
03.17 Interpret basic meteorological data.
03.18 Determine "distance off" by using angular measurements.
03.19 Establish a vessel's dead reckoning (DR) track.
03.20 Determine position by means of celestial navigation.
03.21 Plot position by using Loran and Loran overprint charts.
03.22 Set sea watches.
03.23 Chip and paint vessel.

04.0 MANEUVER AROUND OFFSHORE STRUCTURES--The student will be able to:

04.01 Assist personnel in boarding personnel basket.
04.02 Maneuver vessel to discharge passengers.
04.03 Maneuver vessel to discharge cargo.
04.04 Secure hoses on board vessel.
04.05 Secure lashings, housers, or mooring lines on board vessel.

05.0 ANCHOR VESSEL--The student will be able to:

05.01 Anchor vessel.
05.02 Maneuver vessel to anchorage area.
05.03 Anchor vessel by using anchor winch.
05.04 Anchor vessel by using anchor windlass.
05.05 Stack (tier) anchor chain in chain locker.

06.0 MANAGE AND PERFORM CARGO HANDLING DUTIES--The student will be able to:

06.01 Adjust vessel's mooring lines to allow for variations of tides and current.
06.02 Determine if all cargo is aboard.

06.03 Determine if all deck cargo is secured.
06.04 Determine if vessel is loaded in compliance with stability laws.
06.05 Discharge cargo by using bulk cargo system.
06.06 Load cargo by suing bulk cargo system.
06.07 Prepare list of lost or damaged cargo.

07.0 PERFORM SHRIMP BOAT DECKHAND DUTIES--The student will be able to:

07.01 Stand lookout, steering, and engine room watches.
07.02 Attach nets, slings, hooks, and other lifting devices to cables, booms, and hoists.
07.03 Load equipment and supplies aboard vessel by hand or using hoisting equipment.
07.04 Signal other workers to move, hoist, and position loads.
07.05 Row boats and dinghies and operate skiffs to transport fishers, and to tow and position nets.
07.06 Attach accessories, such as floats, weights, and markers to nets and lines.
07.07 Pull and guide nets and lines onto vessel.
07.08 Remove shrimp from nets.
07.09 Sort and clean marine life and return undesirable and illegal catch to the sea.
07.10 Operate brine tank and refrigeration equipment.
07.11 Place catch in containers and store in hold and cover with salt and ice.
07.12 Wash deck, conveyors, knives, and other equipment, using brush, detergent, and water.
07.13 Lubricate, adjust, and make minor repairs to engines and equipment.

08.0 PERFORM NET FISHER DUTIES--The student will be able to:

08.01 Catch finfish, shellfish, and other marine life alone or as crew.
08.02 Use and operate equipment such as dip, diver, gill, hoop, lampara, pound, trap, reef, trammel, and travel nets.
08.03 Use and operate equipment such as purse seine, haul, drag, or beach seine.
08.04 Insert and attach hoops, rods, poles, ropes, floats, weights, beam runners, other boards, and cables to form, reinforce, position, set tow and anchor net.
08.05 Attach flags and lights to buoys to identify net location.
08.06 Put net into water and anchor or tow net according to kind of net used, location of fishing area, and method of fishing.
08.07 Haul net to boat or shore manually and using winch.
08.08 Empty catch from net, using dip net, brail bucket, hydraulic pump, and conveyor, and by lifting net, using block and tackle, and dumping catch.
08.09 Store catch in hold and containers, or transfer catch to base ship or bigger boat.
08.10 Ride in skiff and hold end of net as base ship discharges net to surround school of fish or other seafood.
08.11 Sort and clean fish.

08.12 Repair fishing nets and gear.
08.13 Act as lookout or observe instruments to sight schools of fish.

09.0 PERFORM POT FISHER DUTIES--The student will be able to:

09.01 Fish for marine life, including crab, eel, or lobster, using pots (cages with funnel-shaped net openings).
09.02 Tie marker float to line, attach line to pot, fasten bait inside pot, and lower pot into water.
09.03 Hook marker float with pole and pull up pot.
09.04 Reach through hinged door of pot to remove catch or dump catch on deck.
09.05 Measure catch with fixed gauge to insure compliance with legal size.
09.06 Place legal catch in container and toss illegal catch overboard.
09.07 Place peg in hinge of claws to prevent lobsters in container from killing each other.
09.08 Rig and lower dredge (rake scoop with bag net attached), drag dredge behind boat to gather marine life from water bottom, and hoist it to deck by hand using block and tackle.

10.0 PERFORM LINE FISHER DUTIES--The student will be able to:

10.01 Catch fish and other marine life with hooks and lines, working alone or as a member of crew.
10.02 Lay out line and attach hooks, bait, sinkers, and various anchors, floats, and swivels, depending on quarry sought.
10.03 Put line into water, and hold, anchor, or troll (tow) line to catch fish.
10.04 Haul line onto boat deck by hand, reel, or synch, and remove catch.
10.05 Store catch in hold or boxes and pack catch in ice.
10.06 Hit fish with club to stun it before removing it from hook.
10.07 Use gaff to assist in hauling fish from water.
10.08 Slit fish, remove viscera, and wash cavity to clean fish for storage.
10.09 Steer vessel in fishing area.

11.0 BRING VESSEL INTO PORT--The student will be able to:

11.01 Determine approximate position and hazardous conditions by using fathometer.
11.02 Determine position by using radio direction finder (RDF).
11.03 Determine vessel's course and position against dead reckoning plots.

12.0 PERFORM CREW OPERATIONAL AND MAINTENANCE DUTIES ABOARD VESSEL IN PORT--The student will be able to:

12.01 Arrange for dry docking a vessel.
12.02 Change brushes in auxiliary engines.
12.03 Change lube oil filters on auxiliary engines.
12.04 Change fuel filters on auxiliary engines.

12.05 Clean electric motor.
12.06 Prepare list of hoses, valves, connections, gaskets, and tanks needing repairs.
12.07 Determine if const-a-voltage regulator is functioning properly.
12.08 Determine if drive bolts on air compressors are excessively loose.
12.09 Tighten panel box fittings to prevent vibration.
12.10 Clean keel cool strainers.
12.11 Clean oil coolers.
12.12 Clean oil strainers in marine gears.
12.13 Drain water out of fuel traps.
12.14 Tighten fuel and oil line connections on engines.
12.15 Inspect day tanks containing fuel for leaks.
12.16 Lubricate deck and engine room equipment on a regular schedule.
12.17 Determine vessel's manning requirements.
12.18 Wash down vessel's superstructure and decks.

13.0 PREPARE MEALS ABOARD VESSEL--The student will be able to:

13.01 Make yeast breads.
13.02 Make pie crust.
13.03 Make cream filling in pie.
13.04 Make pancakes.
13.05 Make corn bread.
13.06 Make cakes.
13.07 Make biscuits.
13.08 Clean galley deck, woodwork, and cabinets.
13.09 Wash dishes, glasses, flatware, trays, pots and pans.
13.10 Cook vegetables by boiling, simmering and steaming.
13.11 Cook meats, seafood, and fowl by frying.
13.12 Cook meats, seafood, and fowl by stewing and braising.
13.13 Cook meats, seafood, and fowl by broiling.
13.14 Cook meats, seafood, and fowl by roasting or baking.
13.15 Cook meats, seafood, and fowl by braising.
13.16 Season and bread meats, seafoods, and fowl for baking, roasting, broiling and frying.
13.17 Cook eggs by frying and scrambling.
13.18 Make gravies.
13.19 Make coffee.
13.20 Make salads.
13.21 Prepare soup stock.
13.22 Prepare sandwiches.
13.23 Prepare dehydrated or concentrated foods.
13.24 Make soup with stock, meats, vegetables, and seasonings, as required by recipe.
13.25 Carve cooled meats.
13.26 Cut, trim, and bone beef, lamb, pork, or fish into prescribed portions for steaks, chops, and fillets.
13.27 Clean and care for equipment.
13.28 Order food.
13.29 Plan menu.
13.30 Keep records for purchasing foods.
13.31 Store food.
13.32 Keep continuous inventory of food items.

14.0 PLAN AND PERFORM EMERGENCY PROCEDURES--The student will be able to:

14.01 Act as lookout to keep person in sight who has been lost overboard.
14.02 Administer first aid to prevent shock.
14.03 Administer first aid to control bleeding.
14.04 Administer CPR.
14.05 Launch lifeboat and life raft.
14.06 Close emergency fuel shutoff valves.
14.07 Extinguish class A, B, and C type fires.
14.08 Maneuver life raft or lifeboat away from vessel.
14.09 Maneuver vessel to return to area in which person was lost overboard.
14.10 Issue life preservers for use by passengers and crew.
14.11 Secure engine room to prevent spread of fire.
14.12 Send out distress signals.
14.13 Sound abandon-ship alarm.
14.14 Train crew to perform emergency procedures.

15.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

15.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
15.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
15.03 Read and follow written and oral instructions.
15.04 Answer and ask questions coherently and concisely.
15.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
15.06 Demonstrate appropriate telephone/communication skills.

16.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

16.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
16.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
16.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
16.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
16.05 Demonstrate an understanding of federal, state and local taxes and their computation.

17.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

17.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
17.02 Draw conclusions or make inferences from data.

17.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

17.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct a job search.

18.02 Secure information about a job.

18.03 Identify documents which may be required when applying for a job interview.

18.04 Complete a job application form correctly.

18.05 Demonstrate competence in job interview techniques.

18.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

18.07 Identify acceptable work habits.

18.08 Demonstrate knowledge of how to make appropriate job changes.

18.09 Demonstrate acceptable employee health habits.

18.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

19.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

19.01 Define entrepreneurship.

19.02 Describe the importance of entrepreneurship to the American economy.

19.03 List the advantages and disadvantages of business ownership.

19.04 Identify the risks involved in ownership of a business.

19.05 Identify the necessary personal characteristics of a successful entrepreneur.

19.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751210
Course Title: Commercial Fishing 1
Course Credit: 1

COURSE DESCRIPTION:

This course provides instruction in docking, starting, and operating a vessel at sea.

01.0 UNLOCK AND GET VESSEL UNDERWAY--The student will be able to:

- 01.01 Bleed air compressor of water.
- 01.02 Check and maintain batteries.
- 01.03 Measure fuel in day tank.
- 01.04 Maintain proper level of coolant in expansion tank.
- 01.05 Determine if all navigation lights are functioning.
- 01.06 Tighten engine mounts.
- 01.07 Inspect water level indicators for cleanliness.
- 01.08 Test marine radio equipment.
- 01.09 Inspect antenna for physical damage.
- 01.10 Determine if hydraulic steering equipment is free of air and water.
- 01.11 Inspect fire-fighting equipment for excessive wear, proper location, and prescribed type.
- 01.12 Inspect buoyant apparatus for excessive wear, proper location and prescribed type.
- 01.13 Determine that rudder stuffing box is functioning properly.
- 01.14 Tighten propeller stuffing box.
- 01.15 Inspect vessel for fuel leakage.
- 01.16 Prepare list of equipment to be checked for oil leakage.
- 01.17 Determine if proper voltage is being generated.
- 01.18 Maneuver vessel from birth into navigable waterway.
- 01.19 Pump out bilges.
- 01.20 Secure loose deck equipment.
- 01.21 Secure watertight doors, hatches, vents and skylights.

02.0 DOCK A VESSEL--The student will be able to:

- 02.01 Assign crew members positions for mooring vessel.
- 02.02 Cast off vessel's mooring lines while remaining on dock.
- 02.03 Cast off vessel's mooring lines while remaining aboard vessel.
- 02.04 Tie various knots used in maritime operations.
- 02.05 Maneuver vessel to dock.
- 02.06 Release towing gear aboard towing vessel and barges.
- 02.07 Secure mooring lines to dock.
- 02.08 Secure mooring lines to vessel.
- 02.09 Secure engine room.
- 02.10 Secure propeller shaft.

02.11 Inspect engine room equipment for proper maintenance and safety.
02.12 Correct nautical chart prior to departure.
02.13 Prepare vessel to take on fuel and lube oil.
02.14 Prepare to take on water aboard vessel.
02.15 Splice eye into line.

03.0 OPERATE VESSEL AT SEA--The student will be able to:

03.01 Act as vessel's lookout.
03.02 Determine if electrical connections and outlets are tight and dry.
03.03 Determine if electrical outlets have proper voltage.
03.04 Change air filters on engines.
03.05 Change oil and fuel filters on engines.
03.06 Change oil in engines.
03.07 Demonstrate knowledge of the rules of the road in operating a vessel.
03.08 Determine time of arrival when current effect is known.
03.09 Determine time of arrival when current effect is unknown.
03.10 Display day or night signals for different towing situations.
03.11 Inspect heaving lines, mooring lines, and fixed and running rigging for excessive wear.
03.12 Clean engine room and its equipment.
03.13 Determine Greenwich Mean Time (GMT) by using vessel's chronometer.
03.14 Determine position by using Omega navigation system.
03.15 Steer a course by using the magnetic compass.
03.16 Operate radar equipment.
03.17 Interpret basic meteorological data.
03.18 Determine "distance off" by using angular measurements.
03.19 Establish a vessel's dead reckoning (DR) track.
03.20 Determine position by means of celestial navigation.
03.21 Plot position by using Loran and Loran overprint charts.
03.22 Set sea watches.
03.23 Chip and paint vessel.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751220
Course Title: Commercial Fishing 2
Course Credit: 1

COURSE DESCRIPTION:

This course includes instruction in maneuvering, anchoring and handling cargo.

04.0 MANEUVER AROUND OFFSHORE STRUCTURES--The student will be able to:

- 04.01 Assist personnel in boarding personnel basket.
- 04.02 Maneuver vessel to discharge passengers.
- 04.03 Maneuver vessel to discharge cargo.
- 04.04 Secure hoses on board vessel.
- 04.05 Secure lashings, housers, or mooring lines on board vessel.

05.0 ANCHOR VESSEL--The student will be able to:

- 05.01 Anchor vessel.
- 05.02 Maneuver vessel to anchorage area.
- 05.03 Anchor vessel by using anchor winch.
- 05.04 Anchor vessel by using anchor windlass.
- 05.05 Stack (tier) anchor chain in chain locker.

06.0 MANAGE AND PERFORM CARGO HANDLING DUTIES--The student will be able to:

- 06.01 Adjust vessel's mooring lines to allow for variations of tides and current.
- 06.02 Determine if all cargo is aboard.
- 06.03 Determine if all deck cargo is secured.
- 06.04 Determine if vessel is loaded in compliance with stability laws.
- 06.05 Discharge cargo by using bulk cargo system.
- 06.06 Load cargo by suing bulk cargo system.
- 06.07 Prepare list of lost or damaged cargo.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751230
Course Title: Commercial Fishing 3
Course Credit: 1

COURSE DESCRIPTION:

This course includes instruction in shrimping, net fishing, pot fishing, and line fishing.

07.0 PERFORM SHRIMP BOAT DECKHAND DUTIES--The student will be able to:

- 07.01 Stand lookout, steering, and engine room watches.
- 07.02 Attach nets, slings, hooks, and other lifting devices to cables, booms, and hoists.
- 07.03 Load equipment and supplies aboard vessel by hand or using hoisting equipment.
- 07.04 Signal other workers to move, hoist, and position loads.
- 07.05 Row boats and dinghies and operate skiffs to transport fishers, and to tow and position nets.
- 07.06 Attach accessories, such as floats, weights, and markers to nets and lines.
- 07.07 Pull and guide nets and lines onto vessel.
- 07.08 Remove shrimp from nets.
- 07.09 Sort and clean marine life and return undesirable and illegal catch to the sea.
- 07.10 Operate brine tank and refrigeration equipment.
- 07.11 Place catch in containers and store in hold and cover with salt and ice.
- 07.12 Wash deck, conveyors, knives, and other equipment, using brush, detergent, and water.
- 07.13 Lubricate, adjust, and make minor repairs to engines and equipment.

08.0 PERFORM NET FISHER DUTIES--The student will be able to:

- 08.01 Catch finfish, shellfish, and other marine life alone or as crew.
- 08.02 Use and operate equipment such as dip, diver, gill, hoop, lampara, pound, trap, reef, trammel, and travel nets.
- 08.03 Use and operate equipment such as purse seine, haul, drag, or beach seine.
- 08.04 Insert and attach hoops, rods, poles, ropes, floats, weights, beam runners, other boards, and cables to form, reinforce, position, set tow and anchor net.
- 08.05 Attach flags and lights to buoys to identify net location.
- 08.06 Put net into water and anchor or tow net according to kind of net used, location of fishing area, and method of fishing.
- 08.07 Haul net to boat or shore manually and using winch.

08.08 Empty catch from net, using dip net, brail bucket, hydraulic pump, and conveyor, and by lifting net, using block and tackle, and dumping catch.

08.09 Store catch in hold and containers, or transfer catch to base ship or bigger boat.

08.10 Ride in skiff and hold end of net as base ship discharges net to surround school of fish or other seafood.

08.11 Sort and clean fish.

08.12 Repair fishing nets and gear.

08.13 Act as lookout or observe instruments to sight schools of fish.

09.0 PERFORM POT FISHER DUTIES--The student will be able to:

09.01 Fish for marine life, including crab, eel, or lobster, using pots (cages with funnel-shaped net openings).

09.02 Tie marker float to line, attach line to pot, fasten bait inside pot, and lower pot into water.

09.03 Hook marker float with pole and pull up pot.

09.04 Reach through hinged door of pot to remove catch or dump catch on deck.

09.05 Measure catch with fixed gauge to insure compliance with legal size.

09.06 Place legal catch in container and toss illegal catch overboard.

09.07 Place peg in hinge of claws to prevent lobsters in container from killing each other.

09.08 Rig and lower dredge (rake scoop with bag net attached), drag dredge behind boat to gather marine life from water bottom, and hoist it to deck by hand using block and tackle.

10.0 PERFORM LINE FISHER DUTIES--The student will be able to:

10.01 Catch fish and other marine life with hooks and lines, working alone or as a member of crew.

10.02 Lay out line and attach hooks, bait, sinkers, and various anchors, floats, and swivels, depending on quarry sought.

10.03 Put line into water, and hold, anchor, or troll (tow) line to catch fish.

10.04 Haul line onto boat deck by hand, reel, or synch, and remove catch.

10.05 Store catch in hold or boxes and pack catch in ice.

10.06 Hit fish with club to stun it before removing it from hook.

10.07 Use gaff to assist in hauling fish from water.

10.08 Slit fish, remove viscera, and wash cavity to clean fish for storage.

10.09 Steer vessel in fishing area.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751240
Course Title: Commercial Fishing 4
Course Credit: 1

COURSE DESCRIPTION:

This course includes instruction in bringing a vessel into port and performing maintenance duties.

11.0 BRING VESSEL INTO PORT--The student will be able to:

- 11.01 Determine approximate position and hazardous conditions by using fathometer.
- 11.02 Determine position by using radio direction finder (RDF).
- 11.03 Determine vessel's course and position against dead reckoning plots.

12.0 PERFORM CREW OPERATIONAL AND MAINTENANCE DUTIES ABOARD VESSEL IN PORT--The student will be able to:

- 12.01 Arrange for dry docking a vessel.
- 12.02 Change brushes in auxiliary engines.
- 12.03 Change lube oil filters on auxiliary engines.
- 12.04 Change fuel filters on auxiliary engines.
- 12.05 Clean electric motor.
- 12.06 Prepare list of hoses, valves, connections, gaskets, and tanks needing repairs.
- 12.07 Determine if const-a-voltage regulator is functioning properly.
- 12.08 Determine if drive bolts on air compressors are excessively loose.
- 12.09 Tighten panel box fittings to prevent vibration.
- 12.10 Clean keel cool strainers.
- 12.11 Clean oil coolers.
- 12.12 Clean oil strainers in marine gears.
- 12.13 Drain water out of fuel traps.
- 12.14 Tighten fuel and oil line connections on engines.
- 12.15 Inspect day tanks containing fuel for leaks.
- 12.16 Lubricate deck and engine room equipment on a regular schedule.
- 12.17 Determine vessel's manning requirements.
- 12.18 Wash down vessel's superstructure and decks.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751250
Course Title: Commercial Fishing 5
Course Credit: 1

COURSE DESCRIPTION:

This course includes instruction in meals preparation, emergency procedures, and employability skills.

13.0 PREPARE MEALS ABOARD VESSEL--The student will be able to:

13.01 Make yeast breads.
13.02 Make pie crust.
13.03 Make cream filling in pie.
13.04 Make pancakes.
13.05 Make corn bread.
13.06 Make cakes.
13.07 Make biscuits.
13.08 Clean galley deck, woodwork, and cabinets.
13.09 Wash dishes, glasses, flatware, trays, pots and pans.
13.10 Cook vegetables by boiling, simmering and steaming.
13.11 Cook meats, seafood, and fowl by frying.
13.12 Cook meats, seafood, and fowl by stewing and braising.
13.13 Cook meats, seafood, and fowl by broiling.
13.14 Cook meats, seafood, and fowl by roasting or baking.
13.15 Cook meats, seafood, and fowl by braising.
13.16 Season and bread meats, seafoods, and fowl for baking, roasting, broiling and frying.
13.17 Cook eggs by frying and scrambling.
13.18 Make gravies.
13.19 Make coffee.
13.20 Make salads.
13.21 Prepare soup stock.
13.22 Prepare sandwiches.
13.23 Prepare dehydrated or concentrated foods.
13.24 Make soup with stock, meats, vegetables, and seasonings, as required by recipe.
13.25 Carve cooled meats.
13.26 Cut, trim, and bone beef, lamb, pork, or fish into prescribed portions for steaks, chops, and fillets.
13.27 Clean and care for equipment.
13.28 Order food.
13.29 Plan menu.
13.30 Keep records for purchasing foods.
13.31 Store food.
13.32 Keep continuous inventory of food items.

14.0 PLAN AND PERFORM EMERGENCY PROCEDURES--The student will be able to:

14.01 Act as lookout to keep person in sight who has been lost overboard.
14.02 Administer first aid to prevent shock.
14.03 Administer first aid to control bleeding.
14.04 Administer CPR
14.05 Launch lifeboat and life raft.
14.06 Close emergency fuel shutoff valves.
14.07 Extinguish class A, B, and C type fires.
14.08 Maneuver life raft or lifeboat away from vessel.
14.09 Maneuver vessel to return to area in which person was lost overboard.
14.10 Issue life preservers for use by passengers and crew.
14.11 Secure engine room to prevent spread of fire.
14.12 Send out distress signals.
14.13 Sound abandon-ship alarm.
14.14 Train crew to perform emergency procedures.

15.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

15.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
15.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
15.03 Read and follow written and oral instructions.
15.04 Answer and ask questions coherently and concisely.
15.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
15.06 Demonstrate appropriate telephone/communication skills.

16.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

16.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
16.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
16.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
16.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
16.05 Demonstrate an understanding of federal, state and local taxes and their computation.

17.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

17.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
17.02 Draw conclusions or make inferences from data.

17.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

17.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct a job search.

18.02 Secure information about a job.

18.03 Identify documents which may be required when applying for a job interview.

18.04 Complete a job application form correctly.

18.05 Demonstrate competence in job interview techniques.

18.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

18.07 Identify acceptable work habits.

18.08 Demonstrate knowledge of how to make appropriate job changes.

18.09 Demonstrate acceptable employee health habits.

18.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

19.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

19.01 Define entrepreneurship.

19.02 Describe the importance of entrepreneurship to the American economy.

19.03 List the advantages and disadvantages of business ownership.

19.04 Identify the risks involved in ownership of a business.

19.05 Identify the necessary personal characteristics of a successful entrepreneur.

19.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Commercial Foods
Occupational Area:	Industrial Education
	Secondary
Program Numbers	**8763000**
CIP Number	0620.040601
Grade Level	9-12, 30, 31
Length	6 credits
Certification	COMM COOK @7 G
	QUAN FOOD @7 G
	VOC HME EC @4
	HOME EC 1 @2

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as food preparation workers OES 65038421 and cooks DOT 313.361-014. This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content will include the following: food preparation and serving; and identification, storage selection and presentation of a wide variety of foods.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

Listed below are the courses that comprise this program when offered at the secondary level:

8763010 - Commercial Foods 1
8763020 - Commercial Foods 2
8763030 - Commercial Foods 3
8763040 - Commercial Foods 4
8763050 - Commercial Foods 5
8763060 - Commercial Foods 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Commercial Foods industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the

vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

The outcomes and student performance standards which the handicapped student must master must be specified in each student's Individual Education Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate acceptable professional and personal sanitation practices.
02.0 Demonstrate safe working practices.
03.0 Demonstrate equipment operation skills.
04.0 Demonstrate effective cost control.
05.0 Prepare and manage salads.
06.0 Prepare and manage beverages.
07.0 Prepare and manage sandwiches.
08.0 Prepare and manage fruits and vegetables.
09.0 Demonstrate proficiency in dining room operations.
10.0 Demonstrate a proficiency in customer relations.
11.0 Demonstrate appropriate communication skills.
12.0 Demonstrate appropriate math skills.
13.0 Demonstrate appropriate understanding of basic science.
14.0 Demonstrate employability skills.
15.0 Demonstrate an understanding of entrepreneurship.
16.0 Prepare and manage meats, poultry, and seafood.
17.0 Prepare and manage stocks, soups, and sauces/gravies.
18.0 Prepare and manage foods utilizing dairy products.
19.0 Prepare and manage foods utilizing egg products.
20.0 Prepare and manage foods utilizing farinaceous (starchy) products.
21.0 Prepare and manage basic desserts.
22.0 Prepare and manage basic quick breads and yeast dough.
23.0 Prepare and manage specialty items.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Commercial Foods
Secondary Number: 8763000
Postsecondary Number:

01.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--
The student will be able to:

01.01 Chemical/Cleaning Agents:
- 01.01.01 Identify chemicals/cleaning agents and describe and practice proper usage.
- 01.01.02 Identify and practice proper storage procedures for chemicals/cleaning agents.
- 01.01.03 Identify and practice personnel handling precautions for caustics and acids.
- 01.01.04 Identify dangers of food contamination by chemicals/cleaning agents and identify and practice precautions against food contamination by chemicals/cleaning agents.

01.02 Food Borne Illness:
- 01.02.01 Identify food borne illness and possible/probable causes.
- 01.02.02 Identify and practice preventative measures to preclude the occurrence of food borne illness.

01.03 Personal Sanitation:
- 01.03.01 Recognize and practice personal hygiene standards consistent with aesthetic and sanitation requirements of food service operations.

01.04 Receiving/Dry Stores Area:
- 01.04.01 Recognize and maintain a clean and sanitary receiving/dry stores area.
- 01.04.02 Clean and sanitize floors and walls.
- 01.04.03 Recognize and report indications of food spoilage.
- 01.04.04 Recognize and report indications of insect or rodent infestation.

01.05 Food Preparation Areas:
- 01.05.01 Recognize and maintain clean and sanitary food preparation surfaces.
- 01.05.02 Clean and sanitize floors and walls.
- 01.05.03 Recognize and report indications of insect or rodent infestation.

01.06 Range Hoods:
- 01.06.01 Degrease and clean range hoods.
- 01.06.02 Remove, clean, and replace filters.

01.07 Reefers, Chill Boxes, and Freezers (Refrigerated Spaces):
- 01.07.01 Identify safe/correct operating temperatures and limits in accordance with state and county codes and local practices.
- 01.07.02 Recognize and practice sanitary/safe food handling practices in refrigerated spaces.

01.07.03 Recognize and maintain clean and sanitary refrigerated spaces.
01.07.04 Recognize and report indications of food spoilage.

01.08 Food Holding/Serving Lines:
01.08.01 Identify safe/correct operating temperatures and limits in accordance with state and county codes and local practices.
01.08.02 Recognize and practice sanitary/safe food handling practices in food holding areas and serving lines.
01.08.03 Recognize and maintain clean and sanitary food holding areas and serving lines.
01.08.04 Recognize and report indications of food spoilage.

01.09 Dishware/Tableware:
01.09.01 Properly prepare dish washing area for use.
01.09.02 Properly prepare, clean, rinse, sanitize, and dry dishware and tableware items.
01.09.03 Properly clean, sanitize, and secure dish washing area.

01.10 Pots, Pans, and Cook Utensils:
01.10.01 Properly prepare deep-sink area for use.
01.10.02 Properly prepare, clean, rinse, sanitize and dry pots, pans and cooking utensils.
01.10.03 Properly clean, sanitize, and secure deep-sink area.

01.11 Guest/Customer Areas:
01.11.01 Properly clean and sanitize counter areas.
01.11.02 Properly clean and sanitize dining areas.
01.11.03 Properly clean and sanitize restrooms.

02.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

02.01 Safety Hazards:
02.01.01 Identify physical safety rules.
02.01.02 Identify physical safety hazards.
02.01.03 Recognize and correct or report physical safety hazards.
02.01.04 Identify electrical safety rules.
02.01.05 Identify electrical safety hazards.
02.01.06 Recognize and correct or report electrical safety hazards.
02.01.07 Identify fire safety rules.
02.01.08 Identify fire safety hazards.
02.01.09 Recognize and correct or report fire safety hazards.

02.02 First Aid:
02.02.01 Identify First Aid requirements for a commercial food service operation.
02.02.02 Prepare subject and perform Heimlich maneuver.

03.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

03.01 Hand Tools:
03.01.01 Identify special precautions to be used when working with hand tools.
03.01.02 Select and use hand tools in a safe and efficient manner.

03.02 Beverage Equipment:

- 03.02.01 Identify special precautions to be used when working with beverage equipment.
- 03.02.02 Correctly assemble and disassemble beverage equipment.
- 03.02.03 Operate beverage equipment in a safe and efficient manner.

03.03 Pressure Cookers and Steam Equipment:

- 03.03.01 Identify special precautions to be used when working with steam under pressure.
- 03.03.02 Correctly assemble and disassemble equipment. Inspect all parts, gaskets and seals and report any discrepancy.
- 03.03.03 Operate pressure cookers and steam equipment in a safe and efficient manner.

03.04 Grinders and Tenderizers:

- 03.04.01 Identify special precautions to be used when working with grinders and tenderizers.
- 03.04.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.
- 03.04.03 Operate grinders and tenderizers in a safe and efficient manner.

03.05 Knives and Cutting Tools:

- 03.05.01 Identify special precautions to be used when working with knives and cutting tools.
- 03.05.02 Sharpen correctly knives and cutting tools. Inspect handles and guards and report any discrepancy.
- 03.05.03 Use knives and cutting tools in a safe and efficient manner.

03.06 Ovens, Ranges, Griddles, Fryers, Broilers, and Toasters:

- 03.06.01 Identify special precautions to be used when working with ovens, ranges, griddles, fryers, broilers and toasters.
- 03.06.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.
- 03.06.03 Operate ovens, ranges, griddles, fryers, broilers and toasters in a safe and efficient manner.

03.07 Proofers:

- 03.07.01 Identify special precautions to be used when working with proofers.
- 03.07.02 Correctly assemble and disassemble equipment. Inspect all parts, gaskets and seals and report any discrepancy.
- 03.07.03 Operate proofers in a safe and efficient manner.

03.08 Mixers and Blenders:

- 03.08.01 Identify special precautions to be used when working with mixers and blenders.
- 03.08.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.
- 03.08.03 Operate mixers and blenders in a safe and efficient manner.
- 03.08.04 Perform the above competencies for all accessories or attachments used with the equipment.

03.09 Slicing Machines:

03.09.01 Identify special precautions to be used when working with slicing machines.

03.09.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy. (Note: Special attention should be given to the guards on this machine.)

03.09.03 Operate slicing machines in a safe and efficient manner.

03.10 Food Warmers:

03.10.01 Identify special precautions to be used when working with food warmers.

04.0 DEMONSTRATE EFFECTIVE COST CONTROL--The student will be able to:

04.01 Inventory Control:

04.01.01 Receive stores/supplies, count accurately and compare quantity received against invoice. Record received amount and process invoice in accordance with local procedures.

04.01.02 Store received stores/supplies in proper location. Rotate stores/materials in accordance with local procedures.

04.01.03 Conduct and accurately record an inventory of stores/supplies. Process inventory in accordance with local procedures.

04.01.04 Make break-outs and distribute stores/supplies. Utilize local procedures to maintain perpetual inventory.

04.02 Weights and Measures:

04.02.01 Identify standard volume, liquid and weight as they apply to commercial food operations.

04.02.02 Convert accurately between standard units of measure as applicable to commercial food operations.

04.02.03 Convert recipes for both a greater and lesser number of portions.

04.03 Portion Control:

04.03.01 Identify principles of portion control and calculate cost per serving (Note: Cost of incorrect portion size, waste, and spoilage may be addressed here.)

04.03.02 Identify and apply portion control methods.

05.0 PREPARE AND MANAGE SALADS--The student will be able to:

05.01 Identify and select materials for salad preparation.

05.02 Prepare salads.

05.03 Hold salads for service.

05.04 Garnish and present salads.

05.05 Store reusable portions.

05.06 Prepare salad dressings, cold sauces, and derivatives.

06.0 PREPARE AND MANAGE BEVERAGES--The student will be able to:

06.01 Identify and select materials for beverage preparation.

06.02 Prepare hot and cold beverages.

06.03 Hold beverages for serving.
06.04 Garnish and present beverages.
06.05 Store reusable portions.

07.0 PREPARE AND MANAGE SANDWICHES--The student will be able to:

07.01 Identify and select materials for sandwich preparation.
07.02 Prepare hot and cold sandwiches.
07.03 Hold sandwiches for serving.
07.04 Garnish and present sandwiches.
07.05 Store reusable portions.

08.0 PREPARE AND MANAGE FRUITS AND VEGETABLES--The student will be able to:

08.01 Identify and select fruits and vegetables.
08.02 Prepare fruits and vegetables.
08.03 Hold fruits and vegetables for serving.
08.04 Garnish and present fruits and vegetables.
08.05 Store reusable portions.

09.0 PREPARE AND MANAGE MEATS, POULTRY AND SEAFOOD--The student will be able to:

09.01 Identify and select meats:
- 09.01.01 Identify meat characteristics, proper cooking and done temperatures, traditional side dishes and condiments, possible parasites, and potential micro-organism growth.
- 09.01.02 Prepare meats with given recipes.
- 09.01.03 Hold meats for serving.
- 09.01.04 Garnish and present meats.
- 09.01.05 Store reusable portions.

09.02 Identify and select poultry:
- 09.02.01 Identify poultry characteristics, proper cooking and done temperatures, traditional side dishes and condiments, possible parasites, and potential micro-organism growth.
- 09.02.02 Prepare poultry with given recipes.
- 09.02.03 Hold poultry for serving.
- 09.02.04 Garnish and present poultry.
- 09.02.05 Store reusable portions.

09.03 Identify and select seafood:
- 09.03.01 Identify seafood characteristics, proper cooking and done temperatures, traditional side dishes and condiments, possible parasites, and potential micro-organism growth.
- 09.03.02 Prepare seafood with given recipes.
- 09.03.03 Hold seafood for serving.
- 09.03.04 Garnish and present seafood.
- 09.03.05 Store reusable portions.

10.0 PREPARE AND MANAGE STOCKS, SOUPS, AND SAUCES/GRAVIES--The student will be able to:

10.01 Stocks:
- 10.01.01 Identify and select ingredients.
- 10.01.02 Prepare basic stocks.
- 10.01.03 Store stock for future use.

10.02 Soups:
- 10.02.01 Identify and select ingredients.
- 10.02.02 Prepare soups.
- 10.02.03 Hold soups for service.
- 10.02.04 Garnish and present soups
- 10.02.05 Store leftover portions for future use.

10.03 Sauces and Gravies:
- 10.03.01 Identify and select ingredients.
- 10.03.02 Prepare sauces and gravies.
- 10.03.03 Hold sauces and gravies for service.
- 10.03.04 Store left over sauces and gravies for future use.

11.0 PREPARE AND MANAGE FOODS UTILIZING DAIRY PRODUCTS--The student will be able to:

- 11.01 Identify and select dairy products.
- 11.02 Prepare foods utilizing dairy products using given recipes.
- 11.03 Hold food containing dairy products for service.
- 11.04 Garnish and present foods containing dairy products.
- 11.05 Store reusable portions.

12.0 PREPARE AND MANAGE FOODS UTILIZING EGG PRODUCTS--The student will be able to:

- 12.01 Identify and select egg products.
- 12.02 Prepare foods utilizing egg products using given recipes.
- 12.03 Hold food containing egg products for service.
- 12.04 Garnish and present foods containing egg products.
- 12.05 Store reusable portions.

13.0 PREPARE AND MANAGE FOODS UTILIZING FARINACEOUS (STARCHY) PRODUCTS--The student will be able to:

- 13.01 Identify and select farinaceous products.
- 13.02 Prepare foods utilizing farinaceous products using given recipes.
- 13.03 Hold food containing farinaceous products for service.
- 13.04 Garnish and present foods containing farinaceous products.
- 13.05 Store reusable portions.

14.0 PREPARE AND MANAGE BASIC DESSERTS--The student will be able to:

- 14.01 Identify and select dessert ingredients.
- 14.02 Prepare basic dessert products.
- 14.03 Hold dessert products for service.
- 14.04 Garnish and present dessert products.
- 14.05 Store reusable portions.

15.0 PREPARE AND MANAGE BASIC QUICK BREADS AND YEAST DOUGH--The student will be able to:

15.01 Quick Breads:
- 15.01.01 Identify and select quick bread ingredients.
- 15.01.02 Prepare quick breads using given recipes
- 15.01.03 Hold quick breads for service.
- 15.01.04 Present quick breads.
- 15.01.05 Store reusable portions.

15.02 Yeast Doughs:
- 15.02.01 Identify and select yeast dough ingredients.
- 15.02.02 Prepare yeast dough products using given recipes.
- 15.02.03 Hold yeast dough products for service.
- 15.02.04 Present yeast dough products.
- 15.02.05 Store reusable portions.

16.0 PREPARE AND MANAGE SPECIALTY ITEMS--The student will be able to:

16.01 Hot and Cold Appetizers:
- 16.01.01 Identify and select ingredients.
- 16.01.02 Prepare hot and cold appetizers using given recipes.
- 16.01.03 Hold hot and cold appetizers for service.
- 16.01.04 Garnish and present hot and cold appetizers.
- 16.01.05 Store reusable portions.

16.02 Aspic Coated Appetizers:
- 16.02.01 Identify and select ingredients.
- 16.02.02 Prepare aspic coated appetizers using given recipes.
- 16.02.03 Hold aspic coated appetizers for service.
- 16.02.04 Garnish and present aspic coated appetizers.
- 16.02.05 Store reusable portions.

16.03 Petite Salads:
- 16.03.01 Identify and select ingredients.
- 16.03.02 Prepare petite salads using given recipes.
- 16.03.03 Hold petite salads for service.
- 16.03.04 Garnish and present petite salads.
- 16.03.05 Store reusable portions.

16.04 Specialty Soups and Consumes':
- 16.04.01 Identify and select ingredients.
- 16.04.02 Prepare specialty soups.
- 16.04.03 Hold specialty soups for service.
- 16.04.04 Garnish and present specialty soups.
- 16.04.05 Store left over portions for future use.

16.05 Cocktails:
- 16.05.01 Identify and select ingredients.
- 16.05.02 Prepare cocktails using given recipes.
- 16.05.03 Hold cocktails for service.
- 16.05.04 Garnish and present cocktails.
- 16.05.05 Store reusable portions.

16.06 Dips:
- 16.06.01 Identify and select ingredients.
- 16.06.02 Prepare dips using given recipes.
- 16.06.03 Hold dips for service.
- 16.06.04 Garnish and present dips.
- 16.06.05 Store reusable portions.

16.07 Variety Meats:

16.07.01 Identify variety meat characteristics, proper cooking and done temperatures, traditional side dishes and condiments, possible parasites, and potential micro-organism growth.
16.07.02 Prepare variety meats with given recipes.
16.07.03 Hold variety meats for serving.
16.07.04 Garnish and present variety meats.
16.07.05 Store reusable portions.

16.08 Meringues:
16.08.01 Identify and select ingredients.
16.08.02 Prepare meringues using given recipes.
16.08.03 Hold meringues for service.
16.08.04 Garnish and present meringues.
16.08.05 Store reusable portions.

16.09 Sugar Cookies:
16.09.01 Identify and select ingredients.
16.09.02 Prepare sugar cookies using given recipes.
16.09.03 Hold sugar cookies for service.
16.09.04 Garnish and present sugar cookies.
16.09.05 Store reusable portions.

16.10 Cake Decorating:
16.10.01 Identify and select ingredients for cake decorating.
16.10.02 Select and prepare decorating equipment.
16.10.03 Prepare icings from given recipes.
16.10.04 Decorate cakes and pastries.
16.10.05 Hold cakes and pastries for service.
16.10.06 Present cakes and pastries.
16.10.07 Store reusable portions.
16.10.08 Apply cake decorating practices to garnishes and presentations.

17.0 DEMONSTRATE PROFICIENCY IN DINING ROOM OPERATIONS--The student will be able to:

17.01 Prepare and maintain dining room for service.
17.02 Greet and escort customers.
17.03 Customer Service:
17.03.01 Present menu/menus
17.03.02 Sell and merchandise menu items.
17.03.03 Take orders.
17.03.04 Serve food.
17.03.05 Calculate and present guest check.

17.04 Handling Money:
17.04.01 Demonstrate responsible cash handling.
17.04.02 Demonstrate ability to calculate and county customers change.

18.0 DEMONSTRATE A PROFICIENCY IN CUSTOMER RELATIONS--The student will be able to:

18.01 Resolve customer complaints in a positive professional manner.
18.02 Cope with stressful situations.
18.03 Accommodate the needs of customers (handicapped, infants, elderly.)

18.04 Maintain a positive friendly dining room attitude.
18.05 Display team work.
18.06 Present a neat and clean appearance that will promote a positive image of the establishment.

19.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

19.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
19.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
19.03 Read and follow written and oral instructions.
19.04 Answer and ask questions coherently and concisely.
19.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
19.06 Demonstrate appropriate telephone/communication skills.

20.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

20.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
20.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
20.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
20.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
20.05 Demonstrate an understanding of federal, state and local taxes and their computation.

21.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

21.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
21.02 Draw conclusions or make inferences from data.
21.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
21.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

22.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

22.01 Conduct a job search.
22.02 Secure information about a job.
22.03 Identify documents which may be required when applying for a job interview.
22.04 Complete a job application form correctly.
22.05 Demonstrate competence in job interview techniques.
22.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

22.07 Identify acceptable work habits.
22.08 Demonstrate knowledge of how to make appropriate job changes.
22.09 Demonstrate acceptable employee health habits.
22.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statues Chapter 442.

23.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

23.01 Define entrepreneurship.
23.02 Describe the importance of entrepreneurship to the American economy.
23.03 List the advantages and disadvantages of business ownership.
23.04 Identify the risks involved in ownership of a business.
23.05 Identify the necessary personal characteristics of a successful entrepreneur.
23.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8763010
Course Title: Commercial Foods 1
Course Credit: 1

COURSE DESCRIPTION:

01.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--
The student will be able to:

- 01.01 Chemical/Cleaning Agents:
  - 01.01.01 Identify chemicals/cleaning agents and describe and practice proper usage.
  - 01.01.02 Identify and practice proper storage procedures for chemicals/cleaning agents.
  - 01.01.03 Identify and practice personnel handling precautions for caustics and acids.
  - 01.01.04 Identify dangers of food contamination by chemicals/cleaning agents and identify and practice precautions against food contamination by chemicals/cleaning agents.
- 01.02 Food Borne Illness:
  - 01.02.01 Identify food borne illness and possible/probable causes.
  - 01.02.02 Identify and practice preventative measures to preclude the occurrence of food borne illness.
- 01.03 Personal Sanitation:
  - 01.03.01 Recognize and practice personal hygiene standards consistent with aesthetic and sanitation requirements of food service operations.
- 01.04 Receiving/Dry Stores Area:
  - 01.04.01 Recognize and maintain a clean and sanitary receiving/dry stores area.
  - 01.04.02 Clean and sanitize floors and walls.
  - 01.04.03 Recognize and report indications of food spoilage.
  - 01.04.04 Recognize and report indications of insect or rodent infestation.
- 01.05 Food Preparation Areas:
  - 01.05.01 Recognize and maintain clean and sanitary food preparation surfaces.
  - 01.05.02 Clean and sanitize floors and walls.
  - 01.05.03 Recognize and report indications of insect or rodent infestation.
- 01.06 Range Hoods:
  - 01.06.01 Degrease and clean range hoods.
  - 01.06.02 Remove, clean, and replace filters.
- 01.07 Reefers, Chill Boxes, and Freezers (Refrigerated Spaces):
  - 01.07.01 Identify safe/correct operating temperatures and limits in accordance with state and county codes and local practices.

01.07.02 Recognize and practice sanitary/safe food handling practices in refrigerated spaces.
01.07.03 Recognize and maintain clean and sanitary refrigerated spaces.
01.07.04 Recognize and report indications of food spoilage.

01.08 Food Holding/Serving Lines:
01.08.01 Identify safe/correct operating temperatures and limits in accordance with state and county codes and local practices.
01.08.02 Recognize and practice sanitary/safe food handling practices in food holding areas and serving lines.
01.08.03 Recognize and maintain clean and sanitary food holding areas and serving lines.
01.08.04 Recognize and report indications of food spoilage.

01.09 Dishware/Tableware:
01.09.01 Properly prepare dish washing area for use.
01.09.02 Properly prepare, clean, rinse, sanitize, and dry dishware and tableware items.
01.09.03 Properly clean, sanitize, and secure dish washing area.

01.10 Pots, Pans, and Cook Utensils:
01.10.01 Properly prepare deep-sink area for use.
01.10.02 Properly prepare, clean, rinse, sanitize and dry pots, pans and cooking utensils.
01.10.03 Properly clean, sanitize, and secure deep-sink area.

01.11 Guest/Customer Areas:
01.11.01 Properly clean and sanitize counter areas.
01.11.02 Properly clean and sanitize dining areas.
01.11.03 Properly clean and sanitize restrooms.

02.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

02.01 Safety Hazards:
02.01.01 Identify physical safety rules.
02.01.02 Identify physical safety hazards.
02.01.03 Recognize and correct or report physical safety hazards.
02.01.04 Identify electrical safety rules.
02.01.05 Identify electrical safety hazards.
02.01.06 Recognize and correct or report electrical safety hazards.
02.01.07 Identify fire safety rules.
02.01.08 Identify fire safety hazards.
02.01.09 Recognize and correct or report fire safety hazards.

02.02 First Aid:
02.02.01 Identify First Aid requirements for a commercial food service operation.
02.02.02 Prepare subject and perform Heimlich maneuver.

03.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

03.01 Hand Tools:
03.01.01 Identify special precautions to be used when working with hand tools.

03.01.02 Select and use hand tools in a safe and efficient manner.

03.02 Beverage Equipment:

03.02.01 Identify special precautions to be used when working with beverage equipment.

03.02.02 Correctly assemble and disassemble beverage equipment.

03.02.03 Operate beverage equipment in a safe and efficient manner.

03.03 Pressure Cookers and Steam Equipment:

03.03.01 Identify special precautions to be used when working with steam under pressure.

03.03.02 Correctly assemble and disassemble equipment. Inspect all parts, gaskets and seals and report any discrepancy.

03.03.03 Operate pressure cookers and steam equipment in a safe and efficient manner.

03.04 Grinders and Tenderizers:

03.04.01 Identify special precautions to be used when working with grinders and tenderizers.

03.04.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.04.03 Operate grinders and tenderizers in a safe and efficient manner.

03.05 Knives and Cutting Tools:

03.05.01 Identify special precautions to be used when working with knives and cutting tools.

03.05.02 Sharpen correctly knives and cutting tools. Inspect handles and guards and report any discrepancy.

03.05.03 Use knives and cutting tools in a safe and efficient manner.

03.06 Ovens, Ranges, Griddles, Fryers, Broilers, and Toasters:

03.06.01 Identify special precautions to be used when working with ovens, ranges, griddles, fryers, broilers and toasters.

03.06.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.06.03 Operate ovens, ranges, griddles, fryers, broilers and toasters in a safe and efficient manner.

03.07 Proofers:

03.07.01 Identify special precautions to be used when working with proofers.

03.07.02 Correctly assemble and disassemble equipment. Inspect all parts, gaskets and seals and report any discrepancy.

03.07.03 Operate proofers in a safe and efficient manner.

03.08 Mixers and Blenders:

03.08.01 Identify special precautions to be used when working with mixers and blenders.

03.08.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.08.03 Operate mixers and blenders in a safe and efficient manner.

03.08.04 Perform the above competencies for all accessories or attachments used with the equipment.

03.09 Slicing Machines:

03.09.01 Identify special precautions to be used when working with slicing machines.

03.09.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy. (Note: Special attention should be given to the guards on this machine.)

03.09.03 Operate slicing machines in a safe and efficient manner.

03.10 Food Warmers:

03.10.01 Identify special precautions to be used when working with food warmers.

04.0 DEMONSTRATE EFFECTIVE COST CONTROL--The student will be able to:

04.01 Inventory Control:

04.01.01 Receive stores/supplies, count accurately and compare quantity received against invoice. Record received amount and process invoice in accordance with local procedures.

04.01.02 Store received stores/supplies in proper location. Rotate stores/materials in accordance with local procedures.

04.01.03 Conduct and accurately record an inventory of stores/supplies. Process inventory in accordance with local procedures.

04.01.04 Make break-outs and distribute stores/supplies. Utilize local procedures to maintain perpetual inventory.

04.02 Weights and Measures:

04.02.01 Identify standard volume, liquid and weight as they apply to commercial food operations.

04.02.02 Convert accurately between standard units of measure as applicable to commercial food operations.

04.02.03 Convert recipes for both a greater and lesser number of portions.

04.03 Portion Control:

04.03.01 Identify principles of portion control and calculate cost per serving (Note: Cost of incorrect portion size, waste, and spoilage may be addressed here.)

04.03.02 Identify and apply portion control methods.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8763020
Course Title: Commercial Foods 2
Course Credit: 1

COURSE DESCRIPTION:

01.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--
The student will be able to:

- 01.01 Chemical/Cleaning Agents:
  - 01.01.01 Identify chemicals/cleaning agents and describe and practice proper usage.
  - 01.01.02 Identify and practice proper storage procedures for chemicals/cleaning agents.
  - 01.01.03 Identify and practice personnel handling precautions for caustics and acids.
  - 01.01.04 Identify dangers of food contamination by chemicals/cleaning agents and identify and practice precautions against food contamination by chemicals/cleaning agents.
- 01.02 Food Borne Illness:
  - 01.02.01 Identify food borne illness and possible/probable causes.
  - 01.02.02 Identify and practice preventative measures to preclude the occurrence of food borne illness.
- 01.03 Personal Sanitation:
  - 01.03.01 Recognize and practice personal hygiene standards consistent with aesthetic and sanitation requirements of food service operations.
- 01.04 Receiving/Dry Stores Area:
  - 01.04.01 Recognize and maintain a clean and sanitary receiving/dry stores area.
  - 01.04.02 Clean and sanitize floors and walls.
  - 01.04.03 Recognize and report indications of food spoilage.
  - 01.04.04 Recognize and report indications of insect or rodent infestation.
- 01.05 Food Preparation Areas:
  - 01.05.01 Recognize and maintain clean and sanitary food preparation surfaces.
  - 01.05.02 Clean and sanitize floors and walls.
  - 01.05.03 Recognize and report indications of insect or rodent infestation.
- 01.06 Range Hoods:
  - 01.06.01 Degrease and clean range hoods.
  - 01.06.02 Remove, clean, and replace filters.
- 01.07 Reefers, Chill Boxes, and Freezers (Refrigerated Spaces):
  - 01.07.01 Identify safe/correct operating temperatures and limits in accordance with state and county codes and local practices.

01.07.02 Recognize and practice sanitary/safe food handling practices in refrigerated spaces.
01.07.03 Recognize and maintain clean and sanitary refrigerated spaces.
01.07.04 Recognize and report indications of food spoilage.

01.08 Food Holding/Serving Lines:
01.08.01 Identify safe/correct operating temperatures and limits in accordance with state and county codes and local practices.
01.08.02 Recognize and practice sanitary/safe food handling practices in food holding areas and serving lines.
01.08.03 Recognize and maintain clean and sanitary food holding areas and serving lines.
01.08.04 Recognize and report indications of food spoilage.

01.09 Dishware/Tableware:
01.09.01 Properly prepare dish washing area for use.
01.09.02 Properly prepare, clean, rinse, sanitize, and dry dishware and tableware items.
01.09.03 Properly clean, sanitize, and secure dish washing area.

01.10 Pots, Pans, and Cook Utensils:
01.10.01 Properly prepare deep-sink area for use.
01.10.02 Properly prepare, clean, rinse, sanitize and dry pots, pans and cooking utensils.
01.10.03 Properly clean, sanitize, and secure deep-sink area.

01.11 Guest/Customer Areas:
01.11.01 Properly clean and sanitize counter areas.
01.11.02 Properly clean and sanitize dining areas.
01.11.03 Properly clean and sanitize restrooms.

02.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

02.01 Safety Hazards:
02.01.01 Identify physical safety rules.
02.01.02 Identify physical safety hazards.
02.01.03 Recognize and correct or report physical safety hazards.
02.01.04 Identify electrical safety rules.
02.01.05 Identify electrical safety hazards.
02.01.06 Recognize and correct or report electrical safety hazards.
02.01.07 Identify fire safety rules.
02.01.08 Identify fire safety hazards.
02.01.09 Recognize and correct or report fire safety hazards.

02.02 First Aid:
02.02.01 Identify First Aid requirements for a commercial food service operation.
02.02.02 Prepare subject and perform Heimlich maneuver.

03.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

03.01 Hand Tools:
03.01.01 Identify special precautions to be used when working with hand tools.

03.01.02 Select and use hand tools in a safe and efficient manner.

03.02 Beverage Equipment:

03.02.01 Identify special precautions to be used when working with beverage equipment.

03.02.02 Correctly assemble and disassemble beverage equipment.

03.02.03 Operate beverage equipment in a safe and efficient manner.

03.03 Pressure Cookers and Steam Equipment:

03.03.01 Identify special precautions to be used when working with steam under pressure.

03.03.02 Correctly assemble and disassemble equipment. Inspect all parts, gaskets and seals and report any discrepancy.

03.03.03 Operate pressure cookers and steam equipment in a safe and efficient manner.

03.04 Grinders and Tenderizers:

03.04.01 Identify special precautions to be used when working with grinders and tenderizers.

03.04.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.04.03 Operate grinders and tenderizers in a safe and efficient manner.

03.05 Knives and Cutting Tools:

03.05.01 Identify special precautions to be used when working with knives and cutting tools.

03.05.02 Sharpen correctly knives and cutting tools. Inspect handles and guards and report any discrepancy.

03.05.03 Use knives and cutting tools in a safe and efficient manner.

03.06 Ovens, Ranges, Griddles, Fryers, Broilers, and Toasters:

03.06.01 Identify special precautions to be used when working with ovens, ranges, griddles, fryers, broilers and toasters.

03.06.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.06.03 Operate ovens, ranges, griddles, fryers, broilers and toasters in a safe and efficient manner.

03.07 Proofers:

03.07.01 Identify special precautions to be used when working with proofers.

03.07.02 Correctly assemble and disassemble equipment. Inspect all parts, gaskets and seals and report any discrepancy.

03.07.03 Operate proofers in a safe and efficient manner.

03.08 Mixers and Blenders:

03.08.01 Identify special precautions to be used when working with mixers and blenders.

03.08.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.08.03 Operate mixers and blenders in a safe and efficient manner.

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03.08.04 Perform the above competencies for all accessories or attachments used with the equipment.

03.09 Slicing Machines:

03.09.01 Identify special precautions to be used when working with slicing machines.

03.09.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy. (Note: Special attention should be given to the guards on this machine.)

03.09.03 Operate slicing machines in a safe and efficient manner.

03.10 Food Warmers:

03.10.01 Identify special precautions to be used when working with food warmers.

03.10.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.10.03 Operate food warmers in a safe and efficient manner.

05.0 PREPARE AND MANAGE SALADS--The student will be able to:

05.01 Identify and select materials for salad preparation.
05.02 Prepare salads.
05.03 Hold salads for service.
05.04 Garnish and present salads.
05.05 Store reusable portions.
05.06 Prepare salad dressings, cold sauces, and derivatives.

06.0 PREPARE AND MANAGE BEVERAGES--The student will be able to:

06.01 Identify and select materials for beverage preparation.
06.02 Prepare hot and cold beverages.
06.03 Hold beverages for serving.
06.04 Garnish and present beverages.
06.05 Store reusable portions.

07.0 PREPARE AND MANAGE SANDWICHES--The student will be able to:

07.01 Identify and select materials for sandwich preparation.
07.02 Prepare hot and cold sandwiches.
07.03 Hold sandwiches for serving.
07.04 Garnish and present sandwiches.
07.05 Store reusable portions.

08.0 PREPARE AND MANAGE FRUITS AND VEGETABLES--The student will be able to

08.01 Identify and select fruits and vegetables.
08.02 Prepare fruits and vegetables.
08.03 Hold fruits and vegetables for serving.
08.04 Garnish and present fruits and vegetables.
08.05 Store reusable portions.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8763030
Course Title: Commercial Foods 3
Course Credit: 1

COURSE DESCRIPTION:

01.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--
The student will be able to:

- 01.01 Chemical/Cleaning Agents:
  - 01.01.01 Identify chemicals/cleaning agents and describe and practice proper usage.
  - 01.01.02 Identify and practice proper storage procedures for chemicals/cleaning agents.
  - 01.01.03 Identify and practice personnel handling precautions for caustics and acids.
  - 01.01.04 Identify dangers of food contamination by chemicals/cleaning agents and identify and practice precautions against food contamination by chemicals/cleaning agents.
- 01.02 Food Borne Illness:
  - 01.02.01 Identify food borne illness and possible/probable causes.
  - 01.02.02 Identify and practice preventative measures to preclude the occurrence of food borne illness.
- 01.03 Personal Sanitation:
  - 01.03.01 Recognize and practice personal hygiene standards consistent with aesthetic and sanitation requirements of food service operations.
- 01.04 Receiving/Dry Stores Area:
  - 01.04.01 Recognize and maintain a clean and sanitary receiving/dry stores area.
  - 01.04.02 Clean and sanitize floors and walls.
  - 01.04.03 Recognize and report indications of food spoilage.
  - 01.04.04 Recognize and report indications of insect or rodent infestation.
- 01.05 Food Preparation Areas:
  - 01.05.01 Recognize and maintain clean and sanitary food preparation surfaces.
  - 01.05.02 Clean and sanitize floors and walls.
  - 01.05.03 Recognize and report indications of insect or rodent infestation.
- 01.06 Range Hoods:
  - 01.06.01 Degrease and clean range hoods.
  - 01.06.02 Remove, clean, and replace filters.
- 01.07 Reefers, Chill Boxes, and Freezers (Refrigerated Spaces):
  - 01.07.01 Identify safe/correct operating temperatures and limits in accordance with state and county codes and local practices.

01.07.02 Recognize and practice sanitary/safe food handling practices in refrigerated spaces.
01.07.03 Recognize and maintain clean and sanitary refrigerated spaces.
01.07.04 Recognize and report indications of food spoilage.

01.08 Food Holding/Serving Lines:
01.08.01 Identify safe/correct operating temperatures and limits in accordance with state and county codes and local practices.
01.08.02 Recognize and practice sanitary/safe food handling practices in food holding areas and serving lines.
01.08.03 Recognize and maintain clean and sanitary food holding areas and serving lines.
01.08.04 Recognize and report indications of food spoilage.

01.09 Dishware/Tableware:
01.09.01 Properly prepare dish washing area for use.
01.09.02 Properly prepare, clean, rinse, sanitize, and dry dishware and tableware items.
01.09.03 Properly clean, sanitize, and secure dish washing area.

01.10 Pots, Pans, and Cook Utensils:
01.10.01 Properly prepare deep-sink area for use.
01.10.02 Properly prepare, clean, rinse, sanitize and dry pots, pans and cooking utensils.
01.10.03 Properly clean, sanitize, and secure deep-sink area.

01.11 Guest/Customer Areas:
01.11.01 Properly clean and sanitize counter areas.
01.11.02 Properly clean and sanitize dining areas.
01.11.03 Properly clean and sanitize restrooms.

02.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

02.01 Safety Hazards:
02.01.01 Identify physical safety rules.
02.01.02 Identify physical safety hazards.
02.01.03 Recognize and correct or report physical safety hazards.
02.01.04 Identify electrical safety rules.
02.01.05 Identify electrical safety hazards.
02.01.06 Recognize and correct or report electrical safety hazards.
02.01.07 Identify fire safety rules.
02.01.08 Identify fire safety hazards.
02.01.09 Recognize and correct or report fire safety hazards.

02.02 First Aid:
02.02.01 Identify First Aid requirements for a commercial food service operation.
02.02.02 Prepare subject and perform Heimlich maneuver.

03.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

03.01 Hand Tools:
03.01.01 Identify special precautions to be used when working with hand tools.

03.01.02 Select and use hand tools in a safe and efficient manner.

03.02 Beverage Equipment:

03.02.01 Identify special precautions to be used when working with beverage equipment.

03.02.02 Correctly assemble and disassemble beverage equipment.

03.02.03 Operate beverage equipment in a safe and efficient manner.

03.03 Pressure Cookers and Steam Equipment:

03.03.01 Identify special precautions to be used when working with steam under pressure.

03.03.02 Correctly assemble and disassemble equipment. Inspect all parts, gaskets and seals and report any discrepancy.

03.03.03 Operate pressure cookers and steam equipment in a safe and efficient manner.

03.04 Grinders and Tenderizers:

03.04.01 Identify special precautions to be used when working with grinders and tenderizers.

03.04.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.04.03 Operate grinders and tenderizers in a safe and efficient manner.

03.05 Knives and Cutting Tools:

03.05.01 Identify special precautions to be used when working with knives and cutting tools.

03.05.02 Sharpen correctly knives and cutting tools. Inspect handles and guards and report any discrepancy.

03.05.03 Use knives and cutting tools in a safe and efficient manner.

03.06 Ovens, Ranges, Griddles, Fryers, Broilers, and Toasters:

03.06.01 Identify special precautions to be used when working with ovens, ranges, griddles, fryers, broilers and toasters.

03.06.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.06.03 Operate ovens, ranges, griddles, fryers, broilers and toasters in a safe and efficient manner.

03.07 Proofers:

03.07.01 Identify special precautions to be used when working with proofers.

03.07.02 Correctly assemble and disassemble equipment. Inspect all parts, gaskets and seals and report any discrepancy.

03.07.03 Operate proofers in a safe and efficient manner.

03.08 Mixers and Blenders:

03.08.01 Identify special precautions to be used when working with mixers and blenders.

03.08.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.08.03 Operate mixers and blenders in a safe and efficient manner.

03.08.04 Perform the above competencies for all accessories or attachments used with the equipment.

03.09 Slicing Machines:

03.09.01 Identify special precautions to be used when working with slicing machines.

03.09.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy. (Note: Special attention should be given to the guards on this machine.)

03.09.03 Operate slicing machines in a safe and efficient manner.

03.10 Food Warmers:

03.10.01 Identify special precautions to be used when working with food warmers.

03.10.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.10.03 Operate food warmers in a safe and efficient manner.

09.0 PREPARE AND MANAGE MEATS, POULTRY AND SEAFOOD--The student will be able to:

09.01 Identify and select meats:

09.01.01 Identify meat characteristics, proper cooking and done temperatures, traditional side dishes and condiments, possible parasites, and potential micro-organism growth.

09.01.02 Prepare meats with given recipes.

09.01.03 Hold meats for serving.

09.01.04 Garnish and present meats.

09.01.05 Store reusable portions.

09.02 Identify and select poultry:

09.02.01 Identify poultry characteristics, proper cooking and done temperatures, traditional side dishes and condiments, possible parasites, and potential micro-organism growth.

09.02.02 Prepare poultry with given recipes.

09.02.03 Hold poultry for serving.

09.02.04 Garnish and present poultry.

09.02.05 Store reusable portions.

09.03 Identify and select seafood:

09.03.01 Identify seafood characteristics, prope cooking and done temperatures, traditional side dishes and condiments, possible parasites, and potential micro-organism growth.

09.03.02 Prepare seafood with given recipes.

09.03.03 Hold seafood for serving.

09.03.04 Garnish and present seafood.

09.03.05 Store reusable portions.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8763040
Course Title: Commercial Foods 4
Course Credit: 1

COURSE DESCRIPTION:

01.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--
The student will be able to:

- 01.01 Chemical/Cleaning Agents:
  - 01.01.01 Identify chemicals/cleaning agents and describe and practice proper usage.
  - 01.01.02 Identify and practice proper storage procedures for chemicals/cleaning agents.
  - 01.01.03 Identify and practice personnel handling precautions for caustics and acids.
  - 01.01.04 Identify dangers of food contamination by chemicals/cleaning agents and identify and practice precautions against food contamination by chemicals/cleaning agents.
- 01.02 Food Borne Illness:
  - 01.02.01 Identify food borne illness and possible/probable causes.
  - 01.02.02 Identify and practice preventative measures to preclude the occurrence of food borne illness.
- 01.03 Personal Sanitation:
  - 01.03.01 Recognize and practice personal hygiene standards consistent with aesthetic and sanitation requirements of food service operations.
- 01.04 Receiving/Dry Stores Area:
  - 01.04.01 Recognize and maintain a clean and sanitary receiving/dry stores area.
  - 01.04.02 Clean and sanitize floors and walls.
  - 01.04.03 Recognize and report indications of food spoilage.
  - 01.04.04 Recognize and report indications of insect or rodent infestation.
- 01.05 Food Preparation Areas:
  - 01.05.01 Recognize and maintain clean and sanitary food preparation surfaces.
  - 01.05.02 Clean and sanitize floors and walls.
  - 01.05.03 Recognize and report indications of insect or rodent infestation.
- 01.06 Range Hoods:
  - 01.06.01 Degrease and clean range hoods.
  - 01.06.02 Remove, clean, and replace filters.
- 01.07 Reefers, Chill Boxes, and Freezers (Refrigerated Spaces):
  - 01.07.01 Identify safe/correct operating temperatures and limits in accordance with state and county codes and local practices.

01.07.02 Recognize and practice sanitary/safe food handling practices in refrigerated spaces.
01.07.03 Recognize and maintain clean and sanitary refrigerated spaces.
01.07.04 Recognize and report indications of food spoilage.

01.08 Food Holding/Serving Lines:
01.08.01 Identify safe/correct operating temperatures and limits in accordance with state and county codes and local practices.
01.08.02 Recognize and practice sanitary/safe food handling practices in food holding areas and serving lines.
01.08.03 Recognize and maintain clean and sanitary food holding areas and serving lines.
01.08.04 Recognize and report indications of food spoilage.

01.09 Dishware/Tableware:
01.09.01 Properly prepare dish washing area for use.
01.09.02 Properly prepare, clean, rinse, sanitize, and dry dishware and tableware items.
01.09.03 Properly clean, sanitize, and secure dish washing area.

01.10 Pots, Pans, and Cook Utensils:
01.10.01 Properly prepare deep-sink area for use.
01.10.02 Properly prepare, clean, rinse, sanitize and dry pots, pans and cooking utensils.
01.10.03 Properly clean, sanitize, and secure deep-sink area.

01.11 Guest/Customer Areas:
01.11.01 Properly clean and sanitize counter areas.
01.11.02 Properly clean and sanitize dining areas.
01.11.03 Properly clean and sanitize restrooms.

02.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

02.01 Safety Hazards:
02.01.01 Identify physical safety rules.
02.01.02 Identify physical safety hazards.
02.01.03 Recognize and correct or report physical safety hazards.
02.01.04 Identify electrical safety rules.
02.01.05 Identify electrical safety hazards.
02.01.06 Recognize and correct or report electrical safety hazards.
02.01.07 Identify fire safety rules.
02.01.08 Identify fire safety hazards.
02.01.09 Recognize and correct or report fire safety hazards.

02.02 First Aid:
02.02.01 Identify First Aid requirements for a commercial food service operation.
02.02.02 Prepare subject and perform Heimlich maneuver.

03.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

03.01 Hand Tools:
03.01.01 Identify special precautions to be used when working with hand tools.

03.01.02 Select and use hand tools in a safe and efficient manner.

03.02 Beverage Equipment:

03.02.01 Identify special precautions to be used when working with beverage equipment.

03.02.02 Correctly assemble and disassemble beverage equipment.

03.02.03 Operate beverage equipment in a safe and efficient manner.

03.03 Pressure Cookers and Steam Equipment:

03.03.01 Identify special precautions to be used when working with steam under pressure.

03.03.02 Correctly assemble and disassemble equipment. Inspect all parts, gaskets and seals and report any discrepancy.

03.03.03 Operate pressure cookers and steam equipment in a safe and efficient manner.

03.04 Grinders and Tenderizers:

03.04.01 Identify special precautions to be used when working with grinders and tenderizers.

03.04.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.04.03 Operate grinders and tenderizers in a safe and efficient manner.

03.05 Knives and Cutting Tools:

03.05.01 Identify special precautions to be used when working with knives and cutting tools.

03.05.02 Sharpen correctly knives and cutting tools. Inspect handles and guards and report any discrepancy.

03.05.03 Use knives and cutting tools in a safe and efficient manner.

03.06 Ovens, Ranges, Griddles, Fryers, Broilers, and Toasters:

03.06.01 Identify special precautions to be used when working with ovens, ranges, griddles, fryers, broilers and toasters.

03.06.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.06.03 Operate ovens, ranges, griddles, fryers, broilers and toasters in a safe and efficient manner.

03.07 Proofers:

03.07.01 Identify special precautions to be used when working with proofers.

03.07.02 Correctly assemble and disassemble equipment. Inspect all parts, gaskets and seals and report any discrepancy.

03.07.03 Operate proofers in a safe and efficient manner.

03.08 Mixers and Blenders:

03.08.01 Identify special precautions to be used when working with mixers and blenders.

03.08.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.08.03 Operate mixers and blenders in a safe and efficient manner.

03.08.04 Perform the above competencies for all accessories or attachments used with the equipment.

03.09 Slicing Machines:

03.09.01 Identify special precautions to be used when working with slicing machines.

03.09.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy. (Note: Special attention should be given to the guards on this machine.)

03.09.03 Operate slicing machines in a safe and efficient manner.

03.10 Food Warmers:

03.10.01 Identify special precautions to be used when working with food warmers.

03.10.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.10.03 Operate food warmers in a safe and efficient manner.

10.0 PREPARE AND MANAGE STOCKS, SOUPS, AND SAUCES/GRAVIES--The student will be able to:

10.01 Stocks:

10.01.01 Identify and select ingredients.

10.01.02 Prepare basic stocks.

10.01.03 Store stock for future use.

10.02 Soups:

10.02.01 Identify and select ingredients.

10.02.02 Prepare soups.

10.02.03 Hold soups for service.

10.02.04 Garnish and present soups

10.02.05 Store leftover portions for future use.

10.03 Sauces and Gravies:

10.03.01 Identify and select ingredients.

10.03.02 Prepare sauces and gravies.

10.03.03 Hold sauces and gravies for service.

10.03.04 Store left over sauces and gravies for future use.

11.0 PREPARE AND MANAGE FOODS UTILIZING DAIRY PRODUCTS--The student will be able to:

11.01 Identify and select dairy products.

11.02 Prepare foods utilizing dairy products using given recipes.

11.03 Hold food containing dairy products for service.

11.04 Garnish and present foods containing dairy products.

11.05 Store reusable portions.

12.0 PREPARE AND MANAGE FOODS UTILIZING EGG PRODUCTS--The student will be able to:

12.01 Identify and select egg products.

12.02 Prepare foods utilizing egg products using given recipes.

12.03 Hold food containing egg products for service.

12.04 Garnish and present foods containing egg products.

12.05 Store reusable portions.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8763050
Course Title: Commercial Foods 5
Course Credit: 1

COURSE DESCRIPTION:

01.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--
The student will be able to:

- 01.01 Chemical/Cleaning Agents:
  - 01.01.01 Identify chemicals/cleaning agents and describe and practice proper usage.
  - 01.01.02 Identify and practice proper storage procedures for chemicals/cleaning agents.
  - 01.01.03 Identify and practice personnel handling precautions for caustics and acids.
  - 01.01.04 Identify dangers of food contamination by chemicals/cleaning agents and identify and practice precautions against food contamination by chemicals/cleaning agents.
- 01.02 Food Borne Illness:
  - 01.02.01 Identify food borne illness and possible/probable causes.
  - 01.02.02 Identify and practice preventative measures to preclude the occurrence of food borne illness.
- 01.03 Personal Sanitation:
  - 01.03.01 Recognize and practice personal hygiene standards consistent with aesthetic and sanitation requirements of food service operations.
- 01.04 Receiving/Dry Stores Area:
  - 01.04.01 Recognize and maintain a clean and sanitary receiving/dry stores area.
  - 01.04.02 Clean and sanitize floors and walls.
  - 01.04.03 Recognize and report indications of food spoilage.
  - 01.04.04 Recognize and report indications of insect or rodent infestation.
- 01.05 Food Preparation Areas:
  - 01.05.01 Recognize and maintain clean and sanitary food preparation surfaces.
  - 01.05.02 Clean and sanitize floors and walls.
  - 01.05.03 Recognize and report indications of insect or rodent infestation.
- 01.06 Range Hoods:
  - 01.06.01 Degrease and clean range hoods.
  - 01.06.02 Remove, clean, and replace filters.
- 01.07 Reefers, Chill Boxes, and Freezers (Refrigerated Spaces):
  - 01.07.01 Identify safe/correct operating temperatures and limits in accordance with state and county codes and local practices.

01.07.02 Recognize and practice sanitary/safe food handling practices in refrigerated spaces.
01.07.03 Recognize and maintain clean and sanitary refrigerated spaces.
01.07.04 Recognize and report indications of food spoilage.

01.08 Food Holding/Serving Lines:
01.08.01 Identify safe/correct operating temperatures and limits in accordance with state and county codes and local practices.
01.08.02 Recognize and practice sanitary/safe food handling practices in food holding areas and serving lines.
01.08.03 Recognize and maintain clean and sanitary food holding areas and serving lines.
01.08.04 Recognize and report indications of food spoilage.

01.09 Dishware/Tableware:
01.09.01 Properly prepare dish washing area for use.
01.09.02 Properly prepare, clean, rinse, sanitize, and dry dishware and tableware items.
01.09.03 Properly clean, sanitize, and secure dish washing area.

01.10 Pots, Pans, and Cook Utensils:
01.10.01 Properly prepare deep-sink area for use.
01.10.02 Properly prepare, clean, rinse, sanitize and dry pots, pans and cooking utensils.
01.10.03 Properly clean, sanitize, and secure deep-sink area.

01.11 Guest/Customer Areas:
01.11.01 Properly clean and sanitize counter areas.
01.11.02 Properly clean and sanitize dining areas.
01.11.03 Properly clean and sanitize restrooms.

02.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

02.01 Safety Hazards:
02.01.01 Identify physical safety rules.
02.01.02 Identify physical safety hazards.
02.01.03 Recognize and correct or report physical safety hazards.
02.01.04 Identify electrical safety rules.
02.01.05 Identify electrical safety hazards.
02.01.06 Recognize and correct or report electrical safety hazards.
02.01.07 Identify fire safety rules.
02.01.08 Identify fire safety hazards.
02.01.09 Recognize and correct or report fire safety hazards.

02.02 First Aid:
02.02.01 Identify First Aid requirements for a commercial food service operation.
02.02.02 Prepare subject and perform Heimlich maneuver.

03.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

03.01 Hand Tools:
03.01.01 Identify special precautions to be used when working with hand tools.

03.01.02 Select and use hand tools in a safe and efficient manner.

03.02 Beverage Equipment:

03.02.01 Identify special precautions to be used when working with beverage equipment.

03.02.02 Correctly assemble and disassemble beverage equipment.

03.02.03 Operate beverage equipment in a safe and efficient manner.

03.03 Pressure Cookers and Steam Equipment:

03.03.01 Identify special precautions to be used when working with steam under pressure.

03.03.02 Correctly assemble and disassemble equipment. Inspect all parts, gaskets and seals and report any discrepancy.

03.03.03 Operate pressure cookers and steam equipment in a safe and efficient manner.

03.04 Grinders and Tenderizers:

03.04.01 Identify special precautions to be used when working with grinders and tenderizers.

03.04.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.04.03 Operate grinders and tenderizers in a safe and efficient manner.

03.05 Knives and Cutting Tools:

03.05.01 Identify special precautions to be used when working with knives and cutting tools.

03.05.02 Sharpen correctly knives and cutting tools. Inspect handles and guards and report any discrepancy.

03.05.03 Use knives and cutting tools in a safe and efficient manner.

03.06 Ovens, Ranges, Griddles, Fryers, Broilers, and Toasters:

03.06.01 Identify special precautions to be used when working with ovens, ranges, griddles, fryers, broilers and toasters.

03.06.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.06.03 Operate ovens, ranges, griddles, fryers, broilers and toasters in a safe and efficient manner.

03.07 Proofers:

03.07.01 Identify special precautions to be used when working with proofers.

03.07.02 Correctly assemble and disassemble equipment. Inspect all parts, gaskets and seals and report any discrepancy.

03.07.03 Operate proofers in a safe and efficient manner.

03.08 Mixers and Blenders:

03.08.01 Identify special precautions to be used when working with mixers and blenders.

03.08.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.08.03 Operate mixers and blenders in a safe and efficient manner.

03.08.04 Perform the above competencies for all accessories or attachments used with the equipment.

03.09 Slicing Machines:

03.09.01 Identify special precautions to be used when working with slicing machines.

03.09.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy. (Note: Special attention should be given to the guards on this machine.)

03.09.03 Operate slicing machines in a safe and efficient manner.

03.10 Food Warmers:

03.10.01 Identify special precautions to be used when working with food warmers.

03.10.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.10.03 Operate food warmers in a safe and efficient manner.

13.0 PREPARE AND MANAGE FOODS UTILIZING FARINACEOUS (STARCHY) PRODUCTS--The student will be able to:

13.01 Identify and select farinaceous products.

13.02 Prepare foods utilizing farinaceous products using given recipes.

13.03 Hold food containing farinaceous products for service.

13.04 Garnish and present foods containing farinaceous products.

13.05 Store reusable portions.

14.0 REPARE AND MANAGE BASIC DESSERTS--The student will be able to:

14.01 Identify and select dessert ingredients.

14.02 Prepare basic dessert products.

14.03 Hold dessert products for service.

14.04 Garnish and present dessert products.

14.05 Store reusable portions.

15.0 PREPARE AND MANAGE BASIC QUICK BREADS AND YEAST DOUGH--The student will be able to:

15.01 Quick Breads:

15.01.01 Identify and select quick bread ingredients.

15.01.02 Prepare quick breads using given recipes.

15.01.03 Hold quick breads for service.

15.01.04 Present quick breads.

15.01.05 Store reusable portions.

15.02 Yeast Doughs:

15.02.01 Identify and select yeast dough ingredients.

15.02.02 Prepare yeast dough products using given recipes.

15.02.03 Hold yeast dough products for service.

15.02.04 Present yeast dough products.

15.02.05 Store reusable portions.

16.0 REPARE AND MANAGE SPECIALTY ITEMS--The student will be able to:

16.01 Hot and Cold Appetizers:
- 16.01.01 Identify and select ingredients.
- 16.01.02 Prepare hot and cold appetizers using given recipes.
- 16.01.03 Hold hot and cold appetizers for service.
- 16.01.04 Garnish and present hot and cold appetizers.
- 16.01.05 Store reusable portions.

16.02 Aspic Coated Appetizers:
- 16.02.01 Identify and select ingredients.
- 16.02.02 Prepare aspic coated appetizers using given recipes.
- 16.02.03 Hold aspic coated appetizers for service.
- 16.02.04 Garnish and present aspic coated appetizers.
- 16.02.05 Store reusable portions.

16.03 Petite Salads:
- 16.03.01 Identify and select ingredients.
- 16.03.02 Prepare petite salads using given recipes.
- 16.03.03 Hold petite salads for service.
- 16.03.04 Garnish and present petite salads.
- 16.03.05 Store reusable portions.

16.04 Specialty Soups and Consumes':
- 16.04.01 Identify and select ingredients.
- 16.04.02 Prepare specialty soups.
- 16.04.03 Hold specialty soups for service.
- 16.04.04 Garnish and present specialty soups.
- 16.04.05 Store left over portions for future use.

16.05 Cocktails:
- 16.05.01 Identify and select ingredients.
- 16.05.02 Prepare cocktails using given recipes.
- 16.05.03 Hold cocktails for service.
- 16.05.04 Garnish and present cocktails.
- 16.05.05 Store reusable portions.

16.06 Dips:
- 16.06.01 Identify and select ingredients.
- 16.06.02 Prepare dips using given recipes.
- 16.06.03 Hold dips for service.
- 16.06.04 Garnish and present dips.
- 16.06.05 Store reusable portions.

16.07 Variety Meats:
- 16.07.01 Identify variety meat characteristics, proper cooking and done temperatures, traditional side dishes and condiments, possible parasites, and potential micro-organism growth.
- 16.07.02 Prepare variety meats with given recipes.
- 16.07.03 Hold variety meats for serving.
- 16.07.04 Garnish and present variety meats.
- 16.07.05 Store reusable portions.

16.08 Meringues:
- 16.08.01 Identify and select ingredients.
- 16.08.02 Prepare meringues using given recipes.
- 16.08.03 Hold meringues for service.
- 16.08.04 Garnish and present meringues.
- 16.08.05 Store reusable portions.

16.09 Sugar Cookies:
- 16.09.01 Identify and select ingredients.
- 16.09.02 Prepare sugar cookies using given recipes.

16.09.03 Hold sugar cookies for service.
16.09.04 Garnish and present sugar cookies.
16.09.05 Store reusable portions.

16.10 Cake Decorating:

16.10.01 Identify and select ingredients for cake decorating.
16.10.02 Select and prepare decorating equipment.
16.10.03 Prepare icings from given recipes.
16.10.04 Decorate cakes and pastries.
16.10.05 Hold cakes and pastries for service.
16.10.06 Present cakes and pastries.
16.10.07 Store reusable portions.
16.10.08 Apply cake decorating practices to garnishes and presentations.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8763060
Course Title: Commercial Foods 6
Course Credit: 1

COURSE DESCRIPTION:

01.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--The student will be able to:

- 01.01 Chemical/Cleaning Agents:
  - 01.01.01 Identify chemicals/cleaning agents and describe and practice proper usage.
  - 01.01.02 Identify and practice proper storage procedures for chemicals/cleaning agents.
  - 01.01.03 Identify and practice personnel handling precautions for caustics and acids.
  - 01.01.04 Identify dangers of food contamination by chemicals/cleaning agents and identify and practice precautions against food contamination by chemicals/cleaning agents.
- 01.02 Food Borne Illness:
  - 01.02.01 Identify food borne illness and possible/probable causes.
  - 01.02.02 Identify and practice preventative measures to preclude the occurrence of food borne illness.
- 01.03 Personal Sanitation:
  - 01.03.01 Recognize and practice personal hygiene standards consistent with aesthetic and sanitation requirements of food service operations.
- 01.04 Receiving/Dry Stores Area:
  - 01.04.01 Recognize and maintain a clean and sanitary receiving/dry stores area.
  - 01.04.02 Clean and sanitize floors and walls.
  - 01.04.03 Recognize and report indications of food spoilage.
  - 01.04.04 Recognize and report indications of insect or rodent infestation.
- 01.05 Food Preparation Areas:
  - 01.05.01 Recognize and maintain clean and sanitary food preparation surfaces.
  - 01.05.02 Clean and sanitize floors and walls.
  - 01.05.03 Recognize and report indications of insect or rodent infestation.
- 01.06 Range Hoods:
  - 01.06.01 Degrease and clean range hoods.
  - 01.06.02 Remove, clean, and replace filters.
- 01.07 Reefers, Chill Boxes, and Freezers (Refrigerated Spaces):

01.07.01 Identify safe/correct operating temperatures and limits in accordance with state and county codes and local practices.

01.07.02 Recognize and practice sanitary/safe food handling practices in refrigerated spaces.

01.07.03 Recognize and maintain clean and sanitary refrigerated spaces.

01.07.04 Recognize and report indications of food spoilage.

01.08 Food Holding/Serving Lines:

01.08.01 Identify safe/correct operating temperatures and limits in accordance with state and county codes and local practices.

01.08.02 Recognize and practice sanitary/safe food handling practices in food holding areas and serving lines.

01.08.03 Recognize and maintain clean and sanitary food holding areas and serving lines.

01.08.04 Recognize and report indications of food spoilage.

01.09 Dishware/Tableware:

01.09.01 Properly prepare dish washing area for use.

01.09.02 Properly prepare, clean, rinse, sanitize, and dry dishware and tableware items.

01.09.03 Properly clean, sanitize, and secure dish washing area.

01.10 Pots, Pans, and Cook Utensils:

01.10.01 Properly prepare deep-sink area for use.

01.10.02 Properly prepare, clean, rinse, sanitize and dry pots, pans and cooking utensils.

01.10.03 Properly clean, sanitize, and secure deep-sink area.

01.11 Guest/Customer Areas:

01.11.01 Properly clean and sanitize counter areas.

01.11.02 Properly clean and sanitize dining areas.

01.11.03 Properly clean and sanitize restrooms.

02.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

02.01 Safety Hazards:

02.01.01 Identify physical safety rules.

02.01.02 Identify physical safety hazards.

02.01.03 Recognize and correct or report physical safety hazards.

02.01.04 Identify electrical safety rules.

02.01.05 Identify electrical safety hazards.

02.01.06 Recognize and correct or report electrical safety hazards.

02.01.07 Identify fire safety rules.

02.01.08 Identify fire safety hazards.

02.01.09 Recognize and correct or report fire safety hazards.

02.02 First Aid:

02.02.01 Identify First Aid requirements for a commercial food service operation.

02.02.02 Prepare subject and perform Heimlich maneuver.

03.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

03.01 Hand Tools:

03.01.01 Identify special precautions to be used when working with hand tools.

03.01.02 Select and use hand tools in a safe and efficient manner.

03.02 Beverage Equipment:

03.02.01 Identify special precautions to be used when working with beverage equipment.

03.02.02 Correctly assemble and disassemble beverage equipment.

03.02.03 Operate beverage equipment in a safe and efficient manner.

03.03 Pressure Cookers and Steam Equipment:

03.03.01 Identify special precautions to be used when working with steam under pressure.

03.03.02 Correctly assemble and disassemble equipment. Inspect all parts, gaskets and seals and report any discrepancy.

03.03.03 Operate pressure cookers and steam equipment in a safe and efficient manner.

03.04 Grinders and Tenderizers:

03.04.01 Identify special precautions to be used when working with grinders and tenderizers.

03.04.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.04.03 Operate grinders and tenderizers in a safe and efficient manner.

03.05 Knives and Cutting Tools:

03.05.01 Identify special precautions to be used when working with knives and cutting tools.

03.05.02 Sharpen correctly knives and cutting tools. Inspect handles and guards and report any discrepancy.

03.05.03 Use knives and cutting tools in a safe and efficient manner.

03.06 Ovens, Ranges, Griddles, Fryers, Broilers, and Toasters:

03.06.01 Identify special precautions to be used when working with ovens, ranges, griddles, fryers, broilers and toasters.

03.06.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.06.03 Operate ovens, ranges, griddles, fryers, broilers and toasters in a safe and efficient manner.

03.07 Proofers:

03.07.01 Identify special precautions to be used when working with proofers.

03.07.02 Correctly assemble and disassemble equipment. Inspect all parts, gaskets and seals and report any discrepancy.

03.07.03 Operate proofers in a safe and efficient manner.

03.08 Mixers and Blenders:

03.08.01 Identify special precautions to be used when working with mixers and blenders.

03.08.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.08.03 Operate mixers and blenders in a safe and efficient manner.

03.08.04 Perform the above competencies for all accessories or attachments used with the equipment.

03.09 Slicing Machines:

03.09.01 Identify special precautions to be used when working with slicing machines.

03.09.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy. (Note: Special attention should be given to the guards on this machine.)

03.09.03 Operate slicing machines in a safe and efficient manner.

03.10 Food Warmers:

03.10.01 Identify special precautions to be used when working with food warmers.

03.10.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

03.10.03 Operate food warmers in a safe and efficient manner.

17.0 DEMONSTRATE PROFICIENCY IN DINING ROOM OPERATIONS--The student will be able to:

17.01 Prepare and maintain dining room for service.

17.02 Greet and escort customers.

17.03 Customer Service.

17.03.01 Present menu/menus

17.03.02 Sell and merchandise menu items.

17.03.03 Take orders.

17.03.04 Serve food.

17.03.05 Calculate and present guest check.

17.04 Handling money.

17.04.01 Demonstrate responsible cash handling.

17.04.02 Demonstrate ability to calculate and county customers change.

18.0 DEMONSTRATE A PROFICIENCY IN CUSTOMER RELATIONS--The student will be able to:

18.01 Resolve customer complaints in a positive professional manner.

18.02 Cope with stressful situations.

18.03 Accommodate the needs of customers (handicapped, infants, elderly.)
18.04 Maintain a positive friendly dining room attitude.
18.05 Display team work.
18.06 Present a neat and clean appearance that will promote a positive image of the establishment.

19.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

19.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
19.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
19.03 Read and follow written and oral instructions.
19.04 Answer and ask questions coherently and concisely.
19.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
19.06 Demonstrate appropriate telephone/communication skills.

20.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

20.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
20.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
20.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
20.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
20.05 Demonstrate an understanding of federal, state and local taxes and their computation.

21.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

21.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
21.02 Draw conclusions or make inferences from data.
21.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
21.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

22.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

22.01 Conduct a job search.
22.02 Secure information about a job.

22.03 Identify documents which may be required when applying for a job interview.
22.04 Complete a job application form correctly.
22.05 Demonstrate competence in job interview techniques.
22.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
22.07 Identify acceptable work habits.
22.08 Demonstrate knowledge of how to make appropriate job changes.
22.09 Demonstrate acceptable employee health habits.
22.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statues Chapter 442.

23.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

23.01 Define entrepreneurship.
23.02 Describe the importance of entrepreneurship to the American economy.
23.03 List the advantages and disadvantages of business ownership.
23.04 Identify the risks involved in ownership of a business.
23.05 Identify the necessary personal characteristics of a successful entrepreneur.
23.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Commercial Foods and Culinary Arts
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I200403**
CIP Number	0620.040300
Grade Level	30, 31
Length	1800 hours
Certification	QUAN FOOD @7 G
	COMM COOK @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as restaurant cooks (65026417). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content will include the following: food preparation and serving; and identification, storage, selection and presentation of a wide variety of foods.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Commercial Foods and Culinary Arts industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction is appropriate for this program. When the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences as appropriate and a work station which reflects equipment, skills, and tasks relevant to the occupation

the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 7.0, Language 7.0, Reading 7.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1800 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate general housekeeping operations skills.
02.0 Demonstrate equipment operation skills.
03.0 Demonstrate stock, soup and sauce preparation skills.
04.0 Demonstrate fruit and vegetables preparation skills.
05.0 Demonstrate meat, poultry, fish and seafood preparation skills.
06.0 Demonstrate dairy, egg and farinaceous (starchy) product preparation skills.
07.0 Demonstrate salad, buffet food, beverage and related food preparation skills.
08.0 Demonstrate bakery goods and dessert preparation skills.
09.0 Demonstrate dining room operations skills.
10.0 Demonstrate a proficiency in customer relations.
11.0 Plan organize and implement work.
12.0 Demonstrate appropriate communication skills.
13.0 Demonstrate appropriate math skills.
14.0 Demonstrate appropriate understanding of basic science.
15.0 Demonstrate employability skills.
16.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Commercial Foods And Culinary Arts
Secondary Number:
Postsecondary Number: I200403

01.0 DEMONSTRATE GENERAL HOUSEKEEPING OPERATIONS SKILLS--The student will be able to:

01.01 Receive goods.
01.02 Store goods.
01.03 Distribute goods.
01.04 Clean storage and receiving areas.
01.05 Clean refrigerators and freezers.
01.06 Inventory goods.
01.07 Prepare daily food order.
01.08 Prepare work area.
01.09 Clean work area.
01.10 Store pots and pans.
01.11 Prepare dishwashing area.
01.12 Prepare dishware for washing.
01.13 Wash dishware.
01.14 Clean dishwashing area.
01.15 Clean restrooms.
01.16 Clean floors.
01.17 Clean walls.
01.18 Clean filters.
01.19 Maintain clean and sanitary working area.
01.20 Read and follow equipment operating instructions.
01.21 Recognize and correct or report safety hazards.
01.22 Identify and select cleaning agents.

02.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

02.01 Select and use hand tools.
02.02 Operate beverage equipment.
02.03 Set, control, load and unload ovens for roasting.
02.04 Use pressure cookers and steam equipment.
02.05 Disassemble, clean and reassemble kitchen equipment.
02.06 Operate microwave ovens.
02.07 Operate grinders and tenderizers.
02.08 Select, handle and sharpen knives and other cutting tools.
02.09 Operate ranges, griddles, fryers, broilers and toasters.
02.10 Operate proofers.
02.11 Operate mixers and blenders.
02.12 Operate slicing machines.
02.13 Set up and monitor food warmers.
02.14 Operate convection ovens.
02.15 Identify need and request tool and equipment repairs.
02.16 Operate power cutters, shredders and peelers.
02.17 Operate tilting quantity equipment.
02.18 Operate saws.

03.0 DEMONSTRATE STOCK, SOUP AND SAUCE PREPARATION SKILLS--The student will be able to:

03.01 Prepare basic white stocks.
03.02 Store and handle stocks, soups and sauces.
03.03 Prepare basic brown stocks.
03.04 Prepare fish stocks.
03.05 Prepare roux and other thickening agents.
03.06 Prepare self-thickening soups.
03.07 Prepare cream soups.
03.08 Prepare chowders.
03.09 Prepare tomato sauce and derivatives.
03.10 Recognize soups and sauces by taste and appearance.
03.11 Prepare soup and sauce garnishes.
03.12 Present stocks, soups and sauces for serving.
03.13 Reconstitute powdered soups and sauces.
03.14 Bind soups, sauces and stocks.
03.15 Prepare bechamel sauces and derivatives.
03.16 Prepare espagnole and demiglace sauces and derivatives.
03.17 Make jus and glace de viand.
03.18 Prepare veloutes and derivatives.
03.19 Prepare cold soups.
03.20 Prepare mustard, curry and other non-derivative sauces.
03.21 Prepare emulsions.
03.22 Clarify stocks.
03.23 Prepare clear soups.
03.24 Prepare bisque and other specialty soups.
03.25 Prepare hollandaise and derivatives.
03.26 Prepare mayonnaise and derivatives.

04.0 DEMONSTRATE FRUIT AND VEGETABLES PREPARATION SKILLS--The student will be able to:

04.01 Identify and select fruits and vegetables.
04.02 Clean and store fruit and vegetables.
04.03 Peel and core fruit.
04.04 Peel vegetables by hand or machine.
04.05 Cut fruit and vegetables.
04.06 Zest citrus fruit.
04.07 Score citrus fruit.
04.08 Prepare fruit and vegetable garnishes.
04.09 Section fruit.
04.10 Puree fruit or vegetables.
04.11 Simmer, stew or cream fruit and vegetables.
04.12 Broil fruit or vegetables.
04.13 Bake fruit and vegetables.
04.14 Braise fruit or vegetables.
04.15 Marinate and preserve fruit and vegetables.
04.16 Glaze fruit and vegetables.
04.17 Prepare processed fruits and vegetables.
04.18 Present fruit and vegetables for serving.
04.19 Bread and batter fruit or vegetables.
04.20 Blanche fruits or vegetables.

04.21 Stuff fruits or vegetables.
04.22 Deep fry fruits or vegetables.
04.23 Saute fruits or vegetables.
04.24 Turn vegetables.
04.25 Select, prepare, turn and cook mushrooms.
04.26 Identify, select and prepare nuts.

05.0 DEMONSTRATE MEAT, POULTRY, FISH AND SEAFOOD PREPARATION SKILLS--The student will be able to:

05.01 Identify and select meat and poultry.
05.02 Handle and store meat and poultry.
05.03 Stew meats and poultry.
05.04 Boil meats and poultry.
05.05 Prepare, grind and portion meats.
05.06 Select and determine doneness of meats.
05.07 Grill meats and poultry.
05.08 Broil meats and poultry.
05.09 Prepare garnishes for meat and poultry.
05.10 Portion meat and poultry.
05.11 Barbecue meats and poultry.
05.12 Deep fry meats and poultry.
05.13 Prepare stuffing/dressing.
05.14 Tenderize and marinate meats and poultry.
05.15 Trim and bone meats and poultry.
05.16 Present meats and poultry for serving.
05.17 Bread or batter fish and seafood for cooking.
05.18 Select and prepare processed fish and seafood.
05.19 Deep fry fish or seafood.
05.20 Boil or steam seafood.
05.21 Grill or broil fish and seafood.
05.22 Present fish and seafood for serving.
05.23 Poach meats and poultry.
05.24 Saute meats and poultry.
05.25 Identify types and cuts of meats.
05.26 Blanche meats and poultry.
05.27 Clean and tie poultry and meat.
05.28 Slice and carve meat and poultry.
05.29 Bake or roast meat and poultry.
05.30 Braise meats and poultry.
05.31 Stuff meats and poultry.
05.32 Prepare and cook forcemeat.
05.33 Lard, bard and piquer meats and poultry.
05.34 Prepare jellied meats.
05.35 Identify and select fish and seafoods.
05.36 Clean and wash fish.
05.37 Scale fish.
05.38 Peel and devein soft shellfish.
05.39 Store and handle fresh, frozen and cooked fish and seafood.
05.40 Split and crack lobster and other crustaceans.
05.41 Prepare whole fish for baking.
05.42 Prepare fish for stuffing.
05.43 Stew fish and seafood.
05.44 Saute fish and seafood.

05.45 Poach fish and seafood.
05.46 Braise fish and seafood.
05.47 Prepare snails (escargot).
05.48 Marinate fish and seafoods.
05.49 Open an shuck oysters, clams and mussels.
05.50 Prepare and cook frog legs.
05.51 Stuff fish or seafood.
05.52 Mount fish and seafood for cooking.
05.53 Prepare specialty fish and seafoods (turtle, eel, squid, octopus, etc.).

06.0 DEMONSTRATE DAIRY, EGG AND FARINACEOUS (STARCHY) PRODUCT PREPARATION SKILLS--The student will be able to:

06.01 Identify and select cheeses, milk, creams and butter.
06.02 Identify and select farinaceous foods and cereals.
06.03 Store and handle farinaceous foods and cereals.
06.04 Prepare breakfast cereals.
06.05 Store and handle fresh, frozen and cooked dairy products.
06.06 Store and handle eggs.
06.07 Boil eggs.
06.08 Fry eggs.
06.09 Scramble eggs.
06.10 Poach eggs.
06.11 Prepare omelets.
06.12 Reconstitute dairy or egg products.
06.13 Prepare egg batters.
06.14 Whip cream.
06.15 Select, break and separate eggs.
06.16 Prepare and cook pasta.
06.17 Select, prepare and cook rice for specific dishes.
06.18 Produce stuffed or combined pasta.
06.19 Prepare eggs for binding and coating.
06.20 Present dairy, eggs and farinaceous products for serving.
06.21 Stirr eggs.
06.22 Prepare cold or hot stuffed eggs.
06.23 Prepare hot and cold butters.
06.24 Prepare cream and cheese dressing,s spreads and fillings.
06.25 Prepare custards and cream fillings.
06.26 Prepare and cook crepes.
06.27 Prepare eggs for garnish and aspics.
06.28 Prepare dumplings.
06.29 Prepare souffles.

07.0 DEMONSTRATE SALAD, BUFFET FOOD, BEVERAGE AND RELATED FOOD PREPARATION SKILLS--The student will be able to:

07.01 Store and handle prepared cold food and beverages.
07.02 Reconstitute powdered beverages.
07.03 Prepare sandwich fillings.
07.04 Prepare greens for salads.
07.05 Prepare hot and cold beverages.
07.06 Select and extract juice from fruits and vegetables.
07.07 Prepare hot and cold sandwiches.

07.08 Prepare fruit salads and cocktails.
07.09 Prepare garnishes for salads and cold plats.
07.10 Prepare sliced meats for cold buffets.
07.11 Prepare vegetable salads.
07.12 Prepare farinaceous salads.
07.13 Prepare meat salads.
07.14 Prepare seafood or fish salads.
07.15 Set up and serve buffets.
07.16 Present salads, buffet foods and beverages for serving.
07.17 Prepare seafood cocktails.
07.18 Prepare salad dressings, cold sauces and derivatives.
07.19 Prepare cheese boards.
07.20 Prepare canapes and cold hors d'oeuvres.
07.21 Prepare hot hors d'oeuvres.
07.22 Prepare jellies and aspics.
07.23 Mount or mold meat and poultry.
07.24 Chemiser (coat), decorate, mold and serve buffets.
07.25 Prepare fondues.
07.26 Prepare mousses.
07.27 Prepare fat or ice sculptures.
07.28 Select, use and maintain buffet equipment and utensils.

08.0 DEMONSTRATE BAKERY GOODS AND DESSERT PREPARATION SKILLS--The student will be able to:

08.01 Identify and select baking and dessert ingredients.
08.02 Store and handle baking and dessert products.
08.03 Prepare gelatins and puddings using mixes.
08.04 Prepare baked products using mixes.
08.05 Prepare basic pie dough.
08.06 Make and bake pies.
08.07 Prepare and bake quick breads.
08.08 Prepare and cook pancakes, griddle cakes or waffles.
08.09 Prepare and bake yeast dough.
08.10 Prepare basic cake batters.
08.11 Prepare syrups, sweet sauces and gelatins.
08.12 Prepare and apply butter creams and icings.
08.13 Prepare and bake butter sponge cake.
08.14 Prepare fruit fillings for pie and pastries.
08.15 Present bakery goods and desserts for serving.
08.16 Prepare short paste products and cookies.
08.17 Prepare and cook donuts and other sweet yeast products.
08.18 Prepare and bake choux paste.
08.19 Produce basic pastry creams and Bavarian types.
08.20 Prepare and bake pate a baba.
08.21 Prepare and bake pate a brioche.
08.22 Decorate pastry cakes and desserts.
08.23 Prepare parfaits, bombes and coupes.
08.24 Prepare and bake puff pastry.
08.25 Prepare steam puddings.
08.26 Prepare chiffons.
08.27 Prepare and bake meringues.

09.0 DEMONSTRATE DINING ROOM OPERATIONS SKILLS--The student will be able to:

09.01 Handle guests with special needs children, handicapped and elderly.
09.02 Show customers to table.
09.03 Answer telephones.
09.04 Set tables.
09.05 Prepare beverages.
09.06 Provide counter or snack bar service.
09.07 Present dessert menu.
09.08 Wipe spills.
09.09 Prepare for special events.
09.10 Transport prepared foods.
09.11 Replenish server service station.
09.12 Load and carry bussing tray.
09.13 Clear and re-set dining room tables.
09.14 Return unused condiments.
09.15 Store and maintain equipment for special needs.
09.16 Serve customers.
09.17 Package food and beverages.
09.18 Maintain supplies in counter area.
09.19 Maintain and clean counter area.
09.20 Supervise serving staff.
09.21 Supervise appearance of dining room.
09.22 Greet customers.
09.23 Supervise guest comfort.
09.24 Take reservations.
09.25 Operate cash register.
09.26 Record sales breakdown.
09.27 Balance cash register.
09.28 Setup cafeteria line.
09.29 Display food and beverages.
09.30 Serve and replenish food items.
09.31 Close down cafeteria line.
09.32 Recruit and select employees.
09.33 Orient new employees.
09.34 Train employees.
09.35 Promote professionalism among employees.
09.36 Comply with local, state and federal regulations.
09.37 Calculate and schedule work hours for employees.
09.38 Handle customer complaints.
09.39 Perform bookkeeping duties.
09.40 Calculate ingredient costs selling price.
09.41 Develop and implement merchandising strategy.
09.42 Determine food and beverage requirements.
09.43 Purchase food and beverages.
09.44 Order supplies and equipment.
09.45 Bill customers.

10.0 DEMONSTRATE A PROFICIENCY IN CUSTOMER RELATIONS--The student will be able to:

10.01 Greet customer in a hospitable manner.
10.02 Handle customer complaints in a positive professional manner.
10.03 Handle stressful situations.

10.04 Meet the needs of handicapped and special needs of customers (handicapped, children, elderly).
10.05 Recognize and cater to the personal needs of each customer through a positive, friendly dining room attitude.
10.06 Distinguish the importance of team work in establishing a pleasant dining room atmosphere.
10.07 Present a neat and clean appearance that will promote the image of the establishment in the customer's opinion.
10.08 Express gratitude for customer's patronage and invite them to return.
10.09 Separate personal life from responsibility to work.
10.10 Identify attitudinal problems and discuss with management.
10.11 Sell and merchandise all menu items.
10.12 Project a positive attitude through words, smiles, body language, personality, etc.
10.13 React in all customer relations as though the "customer is always right."
10.14 Identify the advantages that will accrue through self-motivation such as advancement, increased salary and tips, better relations with customers, fellow employees and management.

11.0 PLAN, ORGANIZE AND IMPLEMENT WORK--The student will be able to:

11.01 Direct and monitor operation of meal assembly lines.
11.02 Rotate foods.
11.03 Conserve excess foods.
11.04 Prepare requisitions.
11.05 Write reports.
11.06 Communicate and coordinate work with related operations.
11.07 Take inventory.
11.08 Organize work station.

12.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

12.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
12.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
12.03 Read and follow written and oral instructions.
12.04 Answer and ask questions coherently and concisely.
12.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
12.06 Demonstrate appropriate telephone/communication skills.

13.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

13.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
13.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

13.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
13.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
13.05 Demonstrate an understanding of federal, state and local taxes and their computation.

14.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

14.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
14.02 Draw conclusions or make inferences from data.
14.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
14.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

15.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

15.01 Conduct a job search.
15.02 Secure information about a job.
15.03 Identify documents which may be required when applying for a job.
15.04 Complete a job application form correctly.
15.05 Demonstrate competence in job interview techniques.
15.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
15.07 Identify acceptable work habits.
15.08 Demonstrate knowledge of how to make job changes appropriately.
15.09 Demonstrate acceptable employee health habits.
15.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

16.01 Define entrepreneurship.
16.02 Describe the importance of entrepreneurship to the American economy.
16.03 List the advantages and disadvantages of business ownership.
16.04 Identify the risks involved in ownership of a business.
16.05 Identify the necessary personal characteristics of a successful entrepreneur.
16.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Commercial Photography
Occupational Area:	Industrial Education
	Secondary
Program Numbers	**8772000**
CIP Number	0648.020401
Grade Level	9-12, 30, 31
Length	6 credits
Certification	PHOTOG @7 G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as photographic process workers (89914751).

The program familiarizes individuals with various black and white film, their processes and printing of black and white film. The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, using film, camera, chemicals, photographic paper, laboratory practices and photographic equipment.

Listed below are the courses that comprise this program when offered at the secondary level:

8772010 - Commercial Photography 1
8772020 - Commercial Photography 2
8772030 - Commercial Photography 3
8772040 - Commercial Photography 4
8772050 - Commercial Photography 5
8772060 - Commercial Photography 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Commercial Photography industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program and provide instruction in the tools, materials, processes and precision equipment found in general use throughout the photography industry for the purpose of photographing, processing and presenting photography.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such

organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

The outcomes and student performance standards which the handicapped student must master must be specified in each student's Individual Education Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Perform laboratory skills.
02.0 Control exposures (35mm camera).
03.0 Take basic photographs (35mm camera).
04.0 Operate various format cameras.
05.0 Finish photographs.
06.0 Understand and utilize various photographic lighting techniques.
07.0 Take studio photographs.
08.0 Reproduce photographic media.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate appropriate math skills.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate employability skills.
13.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Commercial Photography
Secondary Number: 8772000
Postsecondary Number:

01.0 PERFORM LABORATORY SKILLS--The student will be able to:

- 01.01 Mix developers and other chemicals.
- 01.02 Hand-process black and white film.
- 01.03 Print black and white photographs.
- 01.04 Process black and white paper.

02.0 CONTROL EXPOSURES (35mm CAMERA)--The student will be able to:

- 02.01 Set appropriate f-stops and shutter speeds.
- 02.02 Select appropriate film type.

03.0 TAKE BASIC PHOTOGRAPHS (35mm CAMERA)--The student will be able to:

- 03.01 Apply camera care and maintenance principles.
- 03.02 Compose photographs.
- 03.03 Take still photographs.
- 03.04 Take action photographs.

04.0 OPERATE VARIOUS FORMAT CAMERAS--The student will be able to:

- 04.01 Use 2¼ format camera.
- 04.02 Use view cameras.

05.0 FINISH PHOTOGRAPHS--The student will be able to:

- 05.01 Mount photographs.
- 05.02 Mat/frame photographs.

06.0 UNDERSTAND AND UTILIZE VARIOUS PHOTOGRAPHIC LIGHTING TECHNIQUES--The student will be able to:

- 06.01 Take photographs with available light.
- 06.02 Take photographs with electronic strobe.
- 06.03 Take photographs with photo-flood lighting.

07.0 TAKE STUDIO PHOTOGRAPHS--The student will be able to:

- 07.01 Take commercial photographs.
- 07.02 Take portraits.

08.0 REPRODUCE PHOTOGRAPHIC MEDIA--The student will be able to:

- 08.01 Copy prints.
- 08.02 Copy transparencies.
- 08.03 Make internegatives.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.

09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.

09.03 Read and follow written and oral instructions.

09.04 Answer and ask questions coherently and concisely.

09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.

09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

11.02 Draw conclusions or make inferences from data.

11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.

12.02 Secure information about a job.

12.03 Identify documents which may be required when applying for a job interview.

12.04 Complete a job application form correctly.

12.05 Demonstrate competence in job interview techniques.

12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

12.07 Identify acceptable work habits.

12.08 Demonstrate knowledge of how to make job changes appropriately.

12.09 Demonstrate acceptable employee health habits.

12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.
13.05 Identify the necessary personal characteristics of a successful entrepreneur.
13.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8772010
Course Title: Commercial Photography 1
Course Credit: 1

COURSE DESCRIPTION:

This course is one in a series of six courses. Introductory course in 35mm camera operation. The use of various light meters in the 35mm cameras as well as hand held light meters will be reviewed. Focusing systems are considered. Film types are compared to lighting conditions for proper exposures. Film loading and unloading are considered. The reciprocal value of apertures and shutter speeds are examined.

02.0 CONTROL EXPOSURES (35mm CAMERA)--The student will be able to:

- 02.01 Set appropriate f-stops and shutter speeds.
- 02.02 Select appropriate film type.

03.0 TAKE BASIC PHOTOGRAPHS (35mm CAMERA)--The student will be able to:

- 03.01 Apply camera care and maintenance principles.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 09.03 Read and follow written and oral instructions.
- 09.04 Answer and ask questions coherently and concisely.
- 09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 09.06 Demonstrate appropriate telephone/communication skills.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8772020
Course Title: Commercial Photography 2
Course Credit: 1

COURSE DESCRIPTION:

This course is one in a series of six courses. The guidelines of composing within the photographic frame are discussed. Posing one or more subjects for portraiture in the studio is considered. The guidelines for setting up a still life are introduced. Other rules for arranging groups, determining format, color harmony, and perspective are introduced.

03.0 TAKE BASIC PHOTOGRAPHS (35mm CAMERA)--The student will be able to:

- 03.02 Compose photographs.
- 03.03 Take still photographs.
- 03.04 Take action photographs.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8772030
Course Title: Commercial Photography 3
Course Credit: 1

COURSE DESCRIPTION:

This is one course in a series of six courses. This course is designed to expose the student to the film procession and enlarging of with the use of photographic chemicals and solutions. Operation of the photographic enlarger is included.

01.0 PERFORM LABORATORY SKILLS--The student will be able to:

- 01.01 Mix developers and other chemicals.
- 01.02 Hand-process black and white film.
- 01.03 Print black and white photographs.
- 01.04 Process black and white paper.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 11.02 Draw conclusions or make inferences from data.
- 11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8772040
Course Title: Commercial Photography 4
Course Credit: 1

COURSE DESCRIPTION:

This is one course in a series of six courses. This course is designed to expose the student in advanced instruction in the use of commercial cameras.

04.0 OPERATE VARIOUS FORMAT CAMERAS--The student will be able to:

04.01 Use 2¼ format camera.
04.02 Use view cameras.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8772050
Course Title: Commercial Photography 5
Course Credit: 1

COURSE DESCRIPTION:

This is one course in a series of six courses. The use of studio lights are reviewed for commercial photography. Formal portraiture lighting, as well as electronic strobe are examined.

06.0 UNDERSTAND AND UTILIZE VARIOUS PHOTOGRAPHIC LIGHTING TECHNIQUES--The student will be able to:

- 06.01 Take photographs with available light.
- 06.02 Take photographs with electronic strobe.
- 06.03 Take photographs with photo-flood lighting.

07.0 TAKE STUDIO PHOTOGRAPHS--The student will be able to:

- 07.01 Take commercial photographs.
- 07.02 Take portraits.

08.0 REPRODUCE PHOTOGRAPHIC MEDIA--The student will be able to:

- 08.01 Copy prints.
- 08.02 Copy transparencies.
- 08.03 Make internegatives.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8772060
Course Title: Commercial Photography 6
Course Credit: 1

COURSE DESCRIPTION:

This is one course in a series of six courses. This course covers that methods of preparing photographic prints for presentation by means of mounting, matting, framing and spraying. Photographic spotting and retouching are also considered. Employability skills are covered in this course.

05.0 FINISH PHOTOGRAPHS--The student will be able to:

- 05.01 Mount photographs.
- 05.02 Mat/frame photographs.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 12.01 Conduct a job search.
- 12.02 Secure information about a job.
- 12.03 Identify documents which may be required when applying for a job interview.
- 12.04 Complete a job application form correctly.
- 12.05 Demonstrate competence in job interview techniques.
- 12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
- 12.07 Identify acceptable work habits.
- 12.08 Demonstrate knowledge of how to make job changes appropriately.
- 12.09 Demonstrate acceptable employee health habits.
- 12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 13.01 Define entrepreneurship.
- 13.02 Describe the importance of entrepreneurship to the American economy.
- 13.03 List the advantages and disadvantages of business ownership.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Commercial Photography Technology
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I480204**
CIP Number	0648.020400
Grade Level	30, 31
Length	1600 hours
Certification	PHOTOG ®7 G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as photographers (34023187), commercial photographers (143.062-030) or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and the use of cameras and laboratory film-processing techniques in portrait, commercial and industrial applications with emphasis on composition and color dynamics, contact printing, enlarging and developing film, and use, care, and maintenance of photographic equipment.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Commercial Photography industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program. Tools, equipment, materials and processes used in the photography programs should be similar to those used in industry.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 9.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

The typical length of this program for the average achieving student is 1600 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Perform laboratory skills.
02.0 Control exposures (35mm camera).
03.0 Take basic photographs (35mm camera).
04.0 Operate various format camera.
05.0 Finish photographs.
06.0 Apply lighting techniques.
07.0 Take studio photographs.
08.0 Reproduce photographic media.
09.0 Process color film.
10.0 Print color photographs.
11.0 Produce media presentations.
12.0 Manage a photographic business.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate appropriate math skills.
15.0 Demonstrate appropriate understanding of basic science.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Commercial Photography Technology
Secondary Number:
Postsecondary Number: I480204

01.0 PERFORM LABORATORY SKILLS--The student will be able to:

- 01.01 Mix developers and other chemicals.
- 01.02 Hand-process black and white film.
- 01.03 Print black and white photographs.
- 01.04 Process black and white paper.

02.0 CONTROL EXPOSURES (35mm CAMERA)--The student will be able to:

- 02.01 Set appropriate f-stops and shutter speeds.
- 02.02 Select appropriate film type.

03.0 TAKE BASIC PHOTOGRAPHS (35mm CAMERA)--The student will be able to:

- 03.01 Apply camera care and maintenance principles.
- 03.02 Compose photographs.
- 03.03 Take still photographs.
- 03.04 Take action photographs.

04.0 OPERATE VARIOUS FORMAT CAMERAS--The student will be able to:

- 04.01 Use 2¼ format camera.
- 04.02 Use view cameras.

05.0 FINISH PHOTOGRAPHS--The student will be able to:

- 5.01 Mount photographs.
- 5.02 Mat/frame photographs.

06.0 APPLY LIGHTING TECHNIQUES--The student will be able to:

- 06.01 Take photographs with available light.
- 06.02 Take photographs with electronic strobe.
- 06.03 Take photographs with photo-flood lighting.

07.0 TAKE STUDIO PHOTOGRAPHS--The student will be able to:

- 07.01 Take commercial photographs.
- 07.02 Take portraits.

08.0 REPRODUCE PHOTOGRAPHIC MEDIA--The student will be able to:

- 08.01 Copy prints.
- 08.02 Copy transparencies.
- 08.03 Make internegatives.

09.0 PROCESS COLOR FILM--The student will be able to:

09.01 Hand process color negatives and transparencies.
09.02 Process color negatives and transparencies.

10.0 PRINT COLOR PHOTOGRAPHS--The student will be able to:

10.01 Process color paper.
10.02 Print color negatives.
10.03 Print color negatives using color analyzer.

11.0 PRODUCE MEDIA PRESENTATIONS--The student will be able to:

11.01 Prepare script for slide presentation.
11.02 Shoot slides for slide presentation.
11.03 Produce slide presentation.
11.04 Prepare script for video presentation.
11.05 Shoot video tape.
11.06 Produce video presentation.

12.0 MANAGE THE PHOTOGRAPHIC BUSINESS--The student will be able to:

12.01 Apply communication skills.
12.02 Apply human relation skills.
12.03 Set rates for photographic work.
12.04 Maintain shop records and files.
12.05 Develop effective advertising.
12.06 Maintain presentational portfolio.

13.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

13.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
13.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
13.03 Read and follow written and oral instructions.
13.04 Answer and ask questions coherently and concisely.
13.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
13.06 Demonstrate appropriate telephone/communication skills.

14.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

14.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
14.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
14.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
14.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

14.05 Demonstrate an understanding of federal, state and local taxes and their computation.

15.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

15.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
15.02 Draw conclusions or make inferences from data.
15.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
15.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Identify documents which may be required when applying for a job interview.
16.04 Complete a job application form correctly.
16.05 Demonstrate competence in job interview techniques.
16.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
16.07 Identify acceptable work habits.
16.08 Demonstrate knowledge of how to make job changes appropriately.
16.09 Demonstrate acceptable employee health habits.
16.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define entrepreneurship.
17.02 Describe the importance of entrepreneurship to the American economy.
17.03 List the advantages and disadvantages of business ownership.
17.04 Identify the risks involved in ownership of a business.
17.05 Identify the necessary personal characteristics of a successful entrepreneur.
17.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Commercial Sign Design And Fabrication
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	N/A
	PSAV
Program Numbers	**I480202**
CIP Number	0648.029900
Grade Level	30, 31
Length	1200 Hours
Certification	COMM ART @7G
Facility Code	244
VSO	VICA
Coop Method	Yes
Apprenticeship	No

I. **PURPOSE**: The purpose of this program is to prepare students for employment as silkscreen printers (979.684-030). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content will include the following: basic art skills; lettering, sign painting, producing silkscreen prints; preparation of layouts and illustrations; computer-generated layout and design; architectural scale renderings; computer-cut letters and graphics; and development of specialized skills.

The course content should also include training in communication, leadership, human relations, employability skills, entrepreneurship principles, and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Sign Design and Fabrication industry; planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program and provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: lettering signs, layout and design, producing silkscreen prints, computer-generated letters and graphics, and fabricating signs.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such

organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 9.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1200 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
SCREEN PRINTER - DOT Code 979.684-030

01.0 Apply basic trade skills.
02.0 Apply basic art skills.
03.0 Apply basic lettering skills.
04.0 Prepare layouts and illustrations.
05.0 Produce signs.
06.0 Prepare printing materials using silkscreen techniques.
07.0 Use computer signmaker.
08.0 Install signs.
09.0 Fabricate signs.
10.0 Wire signs.
11.0 Demonstrate appropriate communication skills.
12.0 Demonstrate appropriate math skills.
13.0 Demonstrate appropriate understanding of basic science.
14.0 Demonstrate employability skills.
15.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Commercial Sign Design And Fabrication
Secondary Number:
Postsecondary Number: I480202

OCCUPATIONAL COMPLETION POINT - DATA CODE A
SCREEN PRINTER - DOT Code 979.684-030

01.0 APPLY BASIC TRADE SKILLS--The student will be able to:

- 01.01 Apply safety skills.
- 01.02 Identify types of art materials.
- 01.03 Use and care of tools.
- 01.04 Maintain presentational portfolio.
- 01.05 Apply effective business practices including estimation of costs and defining differences in production processes.

02.0 APPLY BASIC ART SKILLS--The student will be able to:

- 02.01 Apply principles and elements of design including balance, symmetry, asymmetry, unity, harmony, line and shape, color and tone, contrast of proportion, texture, pattern and motion.
- 02.02 Render a color wheel.
- 02.03 Evaluate a drawing.
- 02.04 Analyze drawing to determine proportion.
- 02.05 Draw freehand sketches.
- 02.06 Draw using one-and two-point perspective.
- 02.07 Make corrections on a drawing.

03.0 APPLY BASIC LETTERING SKILLS--The student will be able to:

- 03.01 letter with speedball pen.
- 03.02 Letter blockstyle using a brush.
- 03.03 Letter Roman style using a brush.
- 03.04 Letter Roman italic style using a brush.
- 03.05 Letter script style using a brush.
- 03.06 Letter text style using a brush.
- 03.07 Letter quick style using a brush.
- 03.08 Letter Roman with serifs using a brush.
- 03.09 Letter using drop shading techniques.
- 03.10 Use striping techniques.

04.0 PREPARE LAYOUTS AND ILLUSTRATIONS--The student will be able to:

- 04.01 Layout thumbnails and roughs.
- 04.02 Layout color comprehensives.
- 04.03 Prepare finished illustrations.
- 04.04 Prepare architectural scale drawings.
- 04.05 Produce sign layouts.

05.0 PRODUCE SIGNS--The student will be able to:

05.01 Produce signs on posterboard.
05.02 Produce cloth and paper banners.
05.03 Produce signs on plywood and masonite.
05.04 Produce signs on metal.
05.05 Produce signs on glass.
05.06 Produce vehicular signs.
05.07 Produce sandblasted signs.
05.08 Produce engraved signs.
05.09 Produce routed signs.
05.10 Produce foam signs.
05.11 Produce signs using gold leaf techniques.
05.12 Produce signs on acrylic and polycarbonate.
05.13 Identify procedures for making neon signs.

06.0 PREPARE PRINTING MATERIAL USING SILKSCREEN TECHNIQUES--The student will be able to:

06.01 Produce silkscreen prints using cut stencil, one color.
06.02 Produce silkscreen prints using cut stencil, multicolor.
06.03 Produce silkscreen prints using photo stencil, one color.
06.04 Produce silkscreen prints using photo stencil, one color halftone.
06.05 Produce silkscreen prints using photo stencil, multicolor.

07.0 USE COMPUTER SIGN MAKER--The student will be able to:

07.01 Perform basic computer operations including layout, design and architectural scale rendering.
07.02 Clean and maintain computer.
07.03 Prepare computer drawn layout and pounce pattern.
07.04 Prepare computer cut vinyl signs.

08.0 INSTALL SIGNS--The student will be able to:

08.01 Describe anchors, fasteners and materials used in sign installation.
08.02 Describe interior sign installation techniques.
08.03 Describe exterior sign installation techniques.

09.0 FABRICATE SIGNS--The student will be able to:

09.01 Describe basic fabrication tools, materials and techniques.
09.02 Fabricate wood signs.
09.03 Fabricate plastic signs.
09.04 Fabricate metal signs.

10.0 WIRE SIGNS--The student will be able to:

10.01 Describe wiring tools and materials.
10.02 Identify electrical codes.
10.03 Wire neon signs.
10.04 Wire fluorescent signs.

11.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 11.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 11.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 11.03 Read and follow written and oral instructions.
- 11.04 Answer and ask questions coherently and concisely.
- 11.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 11.06 Demonstrate appropriate telephone/communication skills.

12.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 12.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 12.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 12.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 12.05 Demonstrate an understanding of federal, state and local taxes and their computation.

13.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 13.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 13.02 Draw conclusions or make inferences from data.
- 13.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 13.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 14.01 Conduct a job search.
- 14.02 Secure information about a job.
- 14.03 Identify documents which may be required when applying for a job.
- 14.04 Complete a job-application form.
- 14.05 Demonstrate competence in job interview techniques.
- 14.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
- 14.07 Identify and adopt acceptable work habits.
- 14.08 Demonstrate knowledge of how to make job changes appropriately.
- 14.09 Demonstrate acceptable employee health habits.

15.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

15.01 Define entrepreneurship.
15.02 Describe the importance of entrepreneurship to the American economy.
15.03 List the advantages and disadvantages of business ownership.
15.04 Identify the risks involved in ownership of a business.
15.05 Identify the necessary personal characteristics of a successful entrepreneur.
15.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Commercial Vehicle Driving
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I490205**
CIP Number	0649.020500
Grade Level	30, 31
Length	320 hours
Certification	COMM DRIV @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as tractor trailer\truck drivers (97105938), (904.383-010). This program also provides supplemental training for persons previously or currently employed in these occupations.

The course content will include the following: operation of large semi truck tractor vehicles; loading and unloading cargo; reporting delays or accidents on the road; verifying load against shipping papers; and keeping records. The course content should also include instruction in human relations, leadership, communication, and employability skills, and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Commercial Vehicle Driving industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Driving range activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: loading, backing and maneuvering on a practice field and public highways with other traffic.

III. **SPECIAL NOTE:** Students entering this program must exhibit a safe driving record, be at least 21 years of age and comply with State and Federal licensing requirements. Instruction will include 1000 miles of over-the-road driving under the supervision of a qualified commercial vehicle driver prior to completion of the program. Over-the-road driving activities will include experience on two-lane, four-lane, interstate, and city streets and highways. Twenty percent or more of the experience will occur at night on both wet and dry roads. Instruction in driving bob-tail, empty and loaded vehicles will be given.

If this program is 450 hours or longer, in accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 8.0 and Language 7.0, Reading 8.0. This grade level number corresponds to a grade

equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 320 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Describe vehicle safety and accident prevention procedures.
02.0 Comply with vehicle operating regulations.
03.0 Demonstrate proper cargo handling and documentation procedures.
04.0 Demonstrate pre-trip preparation procedures.
05.0 Demonstrate vehicle inspection procedures.
06.0 Perform vehicle maintenance and servicing procedures.
07.0 Demonstrate basic vehicle control procedures.
08.0 Demonstrate backing, coupling and uncoupling skills.
09.0 Demonstrate basic vehicle maneuvers.
10.0 Demonstrate road driving skills.
11.0 Describe hazardous driving skills.
12.0 Demonstrate appropriate communication skills.
13.0 Demonstrate appropriate math skills.
14.0 Demonstrate appropriate understanding of basic science.
15.0 Demonstrate employability skills.
16.0 Demonstrate an understanding of entrepreneurship.
17.0 Obtain a Florida Commercial Vehicle Drivers License by passing written and performance tests.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Commercial Vehicle Driving
Secondary Number:
Postsecondary Number: I490205

01.0 DESCRIBE VEHICLE SAFETY AND ACCIDENT PREVENTION PROCEDURES--The student will be able to:

- 01.01 Understand, identify and explain the use of vehicle safety equipment.
- 01.02 Explain the use of fire extinguishers and fire fighting procedures.
- 01.03 Utilize seat belts and personal protection gear appropriate to type of operation.
- 01.04 Describe safe lifting procedures.
- 01.05 Describe personal safety equipment and procedures.
- 01.06 Describe actions applicable for vehicle accidents.
- 01.07 Describe accident reporting requirements (company, state, federal).
- 01.08 Identify all information needed for accident reports to the State, the employer and the insurance company.
- 01.09 Complete an accident report.
- 01.10 Describe procedures for protecting the scene of an accident.
- 01.11 Identify types of hazardous cargos.
- 01.12 Describe personal liability requirements.
- 01.13 Identify hazardous road conditions that are a potential threat to the safety of the tractor trailer driver.
- 01.14 Describe activities and characteristics of other road users that make them potentially dangerous.
- 01.15 Describe the potential consequences of excessive speed.
- 01.16 Describe the potential consequences of use of drugs or alcohol.
- 01.17 Describe and demonstrate safety procedures for mounting and dismounting cab-over-engine tractors.

02.0 UNDERSTAND AND COMPLY WITH VEHICLE OPERATING REGULATIONS--The student will be able to:

- 02.01 Understand and comply with Hours of Service regulations.
- 02.02 Maintain a complete, neat and accurate driver's duty status log.
- 02.03 Keep accurate records required by hours of service regulations.
- 02.04 Perform mathematical calculations necessary to recap and apply totals to the hours of service regulations.
- 02.05 Determine driving hours remaining on a particular day or tour of duty.
- 02.06 Understand and comply with applicable United States Department of Transportation regulations.
- 02.07 Understand and comply with Florida Department of Transportation regulations.
- 02.08 Understand and comply with state and local traffic laws including restrictions on vehicle size and weight.

02.09 Identify permit requirements.

03.0 DEMONSTRATE PROPER CARGO HANDLING AND DOCUMENTATION PROCEDURES--The student will be able to:

03.01 Load and unload cargo safely and efficiently.
03.02 Obtain gross weight and axle weight.
03.03 Distribute cargo load to meet legal weight and safety requirements.
03.04 Secure cargo using blocking, bracing, packing, rope, cable, chains and strapping.
03.05 Mount placards when carrying hazardous materials.
03.06 Describe procedure for use of common cargo handling equipment, including pallets, jacks, dollies, handtrucks, forklift trucks, nets, slings, poles and other equipment.
03.07 Identify categories of hazardous materials and the need for specialized training to handle hazardous materials.
03.08 Identify hazardous materials documentation requirements.
03.09 Verify nature, amount and condition of cargo on both pickup and delivery.
03.10 Verify information on bill of lading and properly record and report discrepancies and damage to the cargo.
03.11 Obtain appropriate signatures on delivery receipts and other required forms.
03.12 Prepare a manifest.
03.13 Handle C.O.D. shipments.
03.14 Verify door seal number against shipping document.
03.15 Comply with port of entry or exit and other inspection station procedures.

04.0 DEMONSTRATE PRE-TRIP PREPARATION PROCEDURES--The student will be able to:

04.01 Check and secure tractor trailer or vehicle permit.
04.02 Check accident report packets for proper contents.
04.03 Plan a route from one point to another that is optimal in terms of travel time, fuel costs, potential hazards and federal, state and local travel restrictions.
04.04 Arrange to secure permits required by the nature of the vehicle, its cargo and route to be traveled.
04.05 Arrange a secure place for vehicle on layovers, especially when transporting hazardous materials.
04.06 Demonstrate map reading skills.
04.07 Estimate travel time and plan rest stops and layovers.
04.08 Estimate fuel consumption and plan fuel stops.
04.09 Estimate expense money and obtain funds and/or credit cards.

05.0 DEMONSTRATE VEHICLE INSPECTION PROCEDURES--The student will be able to:

05.01 Check general appearance and condition of vehicle.
05.02 Check fuel, oil, water levels and automatic transmission fluid level.
05.03 Check signal lights, stop lights and running lights.
05.04 Check tires, rims and suspension.

05.05 Check horn, windshield wipers, mirrors and reflectors.
05.06 Check fifth wheel, trailer hook-up and brake lines.
05.07 Check emergency flares and fire extinguishers.
05.08 Check instruments for normal readings.
05.09 Check steering system, brake action and tractor protection valve.
05.10 Check cargo blocking, bracing and tie down.
05.11 Perform enroute inspections of mirrors, instrument panel, engine and power train, suspension system and brakes.
05.12 Perform post-trip inspection of vehicle and all systems.

06.0 PERFORM VEHICLE MAINTENANCE AND SERVICING PROCEDURES--The student will be able to:

06.01 Describe function and operation of principle vehicle systems including, engine, engine auxiliary brake, drive train, coupling, suspension and electrical system.
06.02 Service engine fuel, oil, coolant, battery and filters.
06.03 Check tire air pressure.
06.04 Change wheels (with tires mounted) and check for proper tire and wheel mounting.
06.05 Drain moisture from air brake supply reservoirs and fuel.
06.06 Check and adjust brakes.
06.07 Clean and repair lights.
06.08 Change fuses and reset circuit breakers.
06.09 Clean interior and exterior of vehicle.
06.10 Check and replace mud/rain flaps.
06.11 Check and adjust tandem and fifth-wheel slides, if so equipped.

07.0 DEMONSTRATE BASIC VEHICLE CONTROL PROCEDURES--The student will:

07.01 Place transmission in neutral before starting engine.
07.02 Start, warm up and shut down the engine, according to the manufacturer's specifications.
07.03 Build full pressure (90-120 PSI) in air tanks before starting.
07.04 Test parking brake and service brake before starting.
07.05 Coordinate use of accelerator and clutch to achieve smooth acceleration and avoid clutch abuse.
07.06 Maintain proper engine RPM while driving.
07.07 Properly modulate air brakes to bring vehicle to a smooth stop.
07.08 Shift up and down through all gears of all major types of conventional transmissions.
07.09 Double clutch and time shift for smooth and fuel efficient performance.
07.10 Select proper gear for speed and highway conditions.
07.11 Operate automatic and semiautomatic transmissions.
07.12 Coordinate steering, braking and acceleration to take the vehicle through a desired path forward and backward in a straight line.
07.13 Adequately judge the path trailer will take (off-tracking) as vehicle negotiates left or right curves and turns.
07.14 Use clutch and gears to slow vehicle.
07.15 Park the vehicle, set brakes and shut off the engine.
07.16 Properly check/block wheels.

08.0 DEMONSTRATE BACKING, COUPLING AND UNCOUPLING SKILLS--The student will:

08.01 Check area before backing.
08.02 Properly utilize guides and mirrors.
08.03 Properly back in straight line and curved paths.
08.04 Properly back into an alley dock.
08.05 Properly parallel park.
08.06 Park in a jackknife position.
08.07 Judge side, rear and overhead clearances and path of the trailer.
08.08 Reverse-steer and articulate a vehicle.
08.09 Align the tractor properly to connect with trailer.
08.10 Back and secure the tractor properly into the trailer kingpin without damage.
08.11 Perform mechanical and visual checks to make sure coupling is secure.
08.12 Connect electrical and air lines properly.
08.13 Set in-cab air brake controls properly.
08.14 Retract and secure landing gear after coupling is secure.
08.15 Properly uncouple and secure the trailer, to include doubles.

09.0 DEMONSTRATE BASIC VEHICLE MANEUVERS--The student will be able to:

09.01 Make a straight-in approach to an alley.
09.02 Drive forward through an alley for 100 feet.
09.03 Properly stop the unit within 12 inches of the end of the alley.
09.04 Back 100 feet through an alley.
09.05 Properly stop the unit within 12 inches of the end of the alley.
09.06 Make proper straight in approach to multiple curves (serpentine).
09.07 Drive forward through curves (serpentine) while keeping tires inside of line.
09.08 Properly position unit for backing into a loading dock.
09.09 Properly back to a dock.
09.10 Properly stop unit within 12 inches of the dock without contacting dock.
09.11 Properly enter a weighing platform.
09.12 Properly maneuver double bottom trailers.

10.0 DEMONSTRATE ROAD DRIVING SKILLS--The student will be able to:

10.01 Carefully enter traffic from parked position.
10.02 Use clutch and gears properly.
10.03 Proceed from a stopped position without rolling backward.
10.04 Use mirrors properly.
10.05 Signal intention to turn well in advance.
10.06 Get into proper lane well in advance of turn.
10.07 Check traffic conditions and turn only when intersection is clear.
10.08 Restrict traffic from passing on right when preparing to complete a right hand turn.

10.09 Complete a turn promptly and safely and not impede other traffic.
10.10 Select and shift to proper gear prior to beginning any turn.
10.11 Obey all traffic signals.
10.12 Plan stop in advance and adjust speed correctly.
10.13 Use brakes properly on grades.
10.14 Plan stop far enough in advance to avoid hard braking.
10.15 Stop clear of crosswalks.
10.16 Come to a complete stop at all stop signs.
10.17 Yield right of way at intersections having yield signs.
10.18 Check for cross traffic regardless of traffic signals.
10.19 Enter all intersections prepared to stop if necessary.
10.20 Stop a minimum of 15 feet but not more than 50 feet before railroad grade crossing if stop is necessary.
10.21 Select proper gear to avoid shifting gears on railroad grade crossing.
10.22 Determine sufficient space required for passing.
10.23 Pass only in safe locations.
10.24 Pass on two-lane highway.
10.25 Pass on four or more lane highway.
10.26 Signal lane changes before and after passing.
10.27 Warn driver ahead of intention to pass.
10.28 Pass only when appropriate to avoid impeding other traffic.
10.29 Return to right lane promptly, but only when safe to do so.
10.30 Observe speed limits.
10.31 Adjust speed properly to road, weather and traffic conditions.
10.32 Slow down in advance of curves, danger zones and intersections.
10.33 Maintain consistent speed where possible.
10.34 Yield right of way.
10.35 Allow faster traffic to pass.
10.36 Use horn only when necessary.
10.37 Park only in legally permissible parking areas.
10.38 Check instruments at regular intervals.
10.39 Maintain proper engine RPM while driving.
10.40 Demonstrate ability to properly maneuver double bottom trailers on two lane and four lane highways.
10.41 Determine minimum front-to-rear distances when following other vehicles.

11.0 DEMONSTRATE HAZARDOUS DRIVING SKILLS--The student will be able to:

11.01 Describe preparation for operation in cold weather, including activating the front brake limiting valve; removing snow and ice from windows, mirrors, brakes, lights, hand and toe holds, etc; and installing tire chains when necessary.
11.02 Demonstrate proper procedure for expelling moisture from the air tanks after each trip.
11.03 Describe proper procedure for checking ice accumulation on brakes, slack adjuster, air hoses, electrical wiring and radiator shutters during operation.
11.04 Describe operational adjustments necessary to maintain control in all weather conditions, including speed selection, braking and following distance.

11.05 Describe procedures to check safe operation of brakes after driving through deep water.

11.06 Perform proper use of windshield wipers, washers and defrosters to maintain visibility.

11.07 Observe and evaluate changing road surface conditions.

11.08 Demonstrate ability for recognizing conditions that produce low traction, including initial rainfall, ice, snow and mud.

11.09 Describe procedures to avoid skidding and jackknifing.

11.10 Describe procedures to avoid hydroplaning and describe the road and vehicle conditions that produce it.

11.11 Describe procedures for mounting and dismounting tire chains.

11.12 Describe procedures for extricating the vehicle from snow, sand and mud by maneuvering or towing.

11.13 Demonstrate ability to adjust rate of change in speed and direction to accommodate road conditions to avoid skidding.

11.14 Describe procedures required to coordinate acceleration and shifting to overcome the resistance of snow, sand and mud.

11.15 Demonstrate ability to perform checks on brake adjustment prior to mountain driving.

11.16 Describe procedures required to use right lane or special truck lane going up grades.

11.17 Describe procedures required to place transmission in appropriate gear for engine braking before starting downgrade.

11.18 Describe procedures required to use proper braking techniques and maintain proper engine braking before starting downgrades.

11.19 Describe proper use of truck escape ramp when brakes fail on a downgrade.

11.20 Describe procedure required for observing temperature gauge frequently when pulling heavy loads up long grades.

11.21 Describe the effect of vehicle weight and speed upon braking and shifting ability on long downgrades.

11.22 Identify the meaning and use of percent of grade signs.

11.23 Demonstrate bringing the truck to a stop in the shortest possible distance while maintaining directional control on a dry surface.

11.24 Describe procedures to make an evasive turn off the roadway and return to the roadway while maintaining directional control.

11.25 Describe procedures to bring the vehicle to a stop in the event of a brake failure.

11.27 Describe procedures to maintain control of the vehicle in the event of a blowout.

11.28 Describe procedures to bring tractor trailer to a stop in the shortest possible distance while maintaining directional control when operating on a slippery surface.

11.29 Describe procedures to recover from tractor or trailer skids induced by snow, ice, water, oil, sand, wet leaves or other slippery surfaces.

11.30 Describe procedures to countersteer out of a skid in a way that will regain directional control and not produce another skid.

11.31 Describe procedure to operate brakes properly to provide maximum braking without loss of control.

12.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

12.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.

12.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.

12.03 Read and follow written and oral instructions.

12.04 Answer and ask questions coherently and concisely.

12.05 Read critically by recognizing assumptions and implications and by evaluating ideas.

12.06 Demonstrate appropriate telephone/communication skills.

13.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

13.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

13.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

13.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

13.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

13.05 Demonstrate an understanding of federal, state and local taxes and their computation.

14.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

14.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

14.02 Draw conclusions or make inferences from data.

14.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

14.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

15.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

15.01 Conduct a job search.

15.02 Secure information about a job.

15.03 Identify documents which may be required when applying for a job interview.

15.04 Complete a job application form correctly.

15.05 Demonstrate competence in job interview techniques.

15.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

15.07 Identify and adopt acceptable work habits.

15.08 Demonstrate knowledge of how to make appropriate job changes.

15.09 Demonstrate acceptable employee health habits.

15.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

16.01 Define entrepreneurship.
16.02 Describe the importance of entrepreneurship to the American economy.
16.03 List the advantages and disadvantages of business ownership.
16.04 Identify the risks involved in ownership of a business.
16.05 Identify the necessary personal characteristics of a successful entrepreneur.
16.06 Identify the business skills needed to operate a small business efficiently and effectively.

17.0 OBTAIN A FLORIDA COMMERCIAL VEHICLE DRIVERS LICENSE BY PASSING WRITTEN AND PERFORMANCE TEST--The student will be able to:

17.01 Demonstrate competence in performing basic commercial vehicle driving skills.
17.02 Demonstrate understanding and knowledge of Florida Commercial Vehicle Driving Laws as required, to safely and legally operate a commercial vehicle.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Communication Electronics
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I470103**
CIP Number	0647.010300
Grade Level	30, 31
Length	1800-2000 hours
Certification	TEC ELEC @7 G
	ELECTRONIC @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as communications technicians. This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content will include the following: operation, maintenance and repair of AM and FM radios, single and double side band radios, data communication equipment, mobile radio/telephone systems, fiber optic systems, microwave equipment and satellite systems. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Communication Electronics industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, test equipment, materials and processes found in industry. Students will use various types of precision test equipment for analyzing, troubleshooting and repairing communication equipment.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction is appropriate for this program. Whenever the cooperative method is offered, the following is required for each student: a training agreement, a training plan signed by the student, teacher and employer, including instructional objectives and a list of on-the-job and in-school learning experiences and a work station which reflects equipment, skills and tasks which are relevant to the

occupation which the student has chosen as a career goal. The student must be paid for work performed.

Electronic Technology and/or Electronic Engineering Technology are prerequisites for entry into this electronic specialization. Algebra is recommended as a prerequisite for entry into this program.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 10.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1800-2000 hours when content from the Florida common core electronics program (Electronics Technology) is included.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in amplitude modulated radio transmitter and receiver systems.
02.0 Demonstrate proficiency in double side band and single side band radio systems.
03.0 Demonstrate proficiency in frequency modulated radio transmitter and receiver systems.
04.0 Demonstrate proficiency in high frequency AM and FM two-way radio systems.
05.0 Demonstrate proficiency in microwave systems.
06.0 Demonstrate proficiency in satellite systems.
07.0 Demonstrate proficiency in video systems.
08.0 Demonstrate proficiency in commercial audio systems.
09.0 Demonstrate proficiency in data communications.
10.0 Demonstrate proficiency in fiber optic communications systems.
11.0 Demonstrate appropriate communication skills.
12.0 Demonstrate appropriate math skills.
13.0 Demonstrate appropriate understanding of basic science.
14.0 Demonstrate employability skills.
15.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Communication Electronics
Secondary Number:
Postsecondary Number: I470103

01.0 DEMONSTRATE PROFICIENCY IN AMPLITUDE MODULATED RADIO TRANSMITTER AND RECEIVER SYSTEMS--The student will be able to:

- 01.01 Describe the operation of amplitude modulated (AM) radio systems.
- 01.02 Identify the stages of AM radio transmitters and receivers.
- 01.03 Define principles of AM modulation.
- 01.04 Analyze and troubleshoot AM transmitter and receiver circuits to include mixers, IF amplifiers, local oscillators, modulators, demodulators and microphones.
- 01.05 Align intermediate frequency (IF) circuits using the AM signal generator or sweep generator and oscilloscope.
- 01.06 Measure the IF section bandwidth using a sweep generator and an oscilloscope or signal generator and a spectrum analyzer.
- 01.07 Measure input voltage sensitivity to the receiver using a signal to noise ratio meter or spectrum analyzer.
- 01.08 Determine signal to noise ratio.
- 01.09 Conduct operating systems checks of AM transmitter and receiver circuits and make minor adjustments.
- 01.10 Set up and adjust AM antenna systems using a power meter and standing wave ratio (SWR) meter.
- 01.11 Analyze AM radio circuits using spectrum analyzers, noise analyzers impedance bridges, sweep generators, dummy loads and phase meters.
- 01.12 Measure AM radio signals using power meters, field strength meters and distortion meters.
- 01.13 Analyze, troubleshoot and adjust AM heterodyning, frequency synthesis, phased locked looped, signal filtering and automatic control circuits.
- 01.14 Analyze, troubleshoot and adjust radio frequency (RF) power amplifier circuits for AM radio transmitters.
- 01.15 Analyze, troubleshoot and adjust AM stereo transmitter and receiver circuits.

02.0 DEMONSTRATE PROFICIENCY IN DOUBLE SIDE BAND AND SINGLE SIDE BAND RADIO SYSTEMS--The student will be able to:

- 02.01 Describe the operation of double side band suppressed carrier (DSSC) radio systems.
- 02.02 Identify the stages of DSSC radio transmitters and receivers.
- 02.03 Analyze and troubleshoot DSSC transmitter and receiver circuits.
- 02.04 Conduct operating systems check of DSSC circuits and make minor adjustments.
- 02.05 Describe the operation of single side band (SSB) radio systems.
- 02.06 Identify the stages of SSB radio transmitters and receivers.

02.07 Analyze and troubleshoot SSB transmitter and receiver circuits.

02.08 Conduct operating systems check of SSB circuits and make minor adjustments.

02.09 Set up and adjust SSB and DSSC antenna systems using power meters and SWR meters.

02.10 Analyze or measure SSB and DSSC radio circuits using spectrum analyzers, noise analyzers, impedance bridges, sweep generators, dummy loads and phase meters.

02.11 Analyze and measure SSB and DSSC radio signals using power meters, field strength meters and distortion meters.

02.12 Analyze, troubleshoot and adjust SSB and DSSC heterodyning, frequency synthesis, phased locked looped, signal filtering and automatic control circuits.

02.13 Analyze, troubleshoot nd adjust RF power amplifier circuits for SSB and DSSC radio transmitters.

03.0 DEMONSTRATE PROFICIENCY IN FREQUENCY MODULATED RADIO TRANSMITTER AND RECEIVER SYSTEMS--The student will be able to:

03.01 Describe the operation of frequency modulated (FM) radio systems.

03.02 Identify the stages of FM radio transmitters and receivers.

03.03 Define principles of FM modulation.

03.04 Analyze and troubleshoot FM transmitter and receiver circuits.

03.05 Align IF circuits using and FM signal generator and sweep generator.

03.06 Measure IF section bandwidth using an oscilloscope or spectrum analyzer.

03.07 Measure receiver input voltage sensitivity to receiver antenna input using a signal to noise ratio meter or spectrum analyzer.

03.08 Conduct operating systems check of FM transmitter and receiver circuits and make minor adjustments.

03.09 Analyze and troubleshoot FM stereo transmitter, receiver and digital tuning circuits.

03.10 Conduct operating systems check of broad band FM stereo transmitter and receiver circuits and make minor adjustments.

03.11 Analyze, troubleshoot and adjust the standard FM right and left channel subcarrier and the subsidiary carrier authority (SCA) signal.

03.12 Analyze, troubleshoot and adjust phase modulation circuits.

03.13 Analyze, troubleshoot and adjust FM pulse modulation circuits.

03.14 Analyze, troubleshoot and adjust FM multiplex circuits.

03.15 Analyze, troubleshoot and adjust wide band and narrow band FM transceiver circuits.

03.16 Set up and adjust FM antenna systems using a power meter and SWR meter.

03.17 Analyze or measure FM radio circuits using spectrum analyzers, noise analyzers, impedance bridges, sweep generators, dummy loads and phase meters.

03.18 Analyze and measure FM radio signals using power meters, field strength meters and distortion meters.

03.19 Analyze, troubleshoot and adjust FM heterodyning, frequency synthesis, phased locked looped, signal filtering and automatic control circuits.

03.20 Analyze, troubleshoot and adjust RF power amplifier circuits for FM radio transmitters.

04.0 DEMONSTRATE PROFICIENCY IN HIGH FREQUENCY AM AND FM TWO-WAY RADIO SYSTEMS--The student will be able to:

04.01 Apply Federal Communications Commission (FCC) rules and regulations to communication requirements.
04.02 Describe the operation of high frequency (HF), very high frequency (VHF) and ultra high frequency (UHF) AM and FM two-way radio systems.
04.03 Identify the stages of HF, VHF and UHF AM and FM two-way radio systems.
04.04 Analyze and troubleshoot HF, VHF and UHF AM and FM two-way radio transmitter and receiver circuits.
04.05 Set up and adjust HF, VHF and UHF AM and FM antenna systems.
04.06 Analyze and troubleshoot the DC remote control on repeater and remote base auxiliary equipment.
04.07 Analyze and troubleshoot the tone remote control on repeater and remote base auxiliary equipment.
04.08 Analyze and troubleshoot the local remote control on repeater and remote base auxiliary equipment.
04.09 Analyze and troubleshoot the RF remote control on repeater and remote base auxiliary equipment.
04.10 Explain paging and mobile phone communications theory and language.
04.11 Analyze and troubleshoot paging and mobile phone two-tone and five-tone paging and digital formats.
04.12 Analyze and troubleshoot paging and mobile phone signaling and operation.
04.13 Service and repair cellular mobile phones and pagers.

05.0 DEMONSTRATE PROFICIENCY IN MICROWAVE SYSTEMS--The student will be able to:

05.01 Describe the operation of microwave transmission systems.
05.02 Identify the components of microwave transmission systems.
05.03 Analyze and troubleshoot microwave transmitter and receiver circuits.
05.04 Conduct operating systems checks of microwave transmitters and receivers and make minor adjustments.
05.05 Identify local codes and deed restrictions applicable to site surveys for microwave installations.
05.06 Set up and adjust microwave antenna systems.
05.07 Measure microwave system power and SWR.
05.08 Describe procedures to interface a microwave system to a public switched telephone network.

06.0 DEMONSTRATE PROFICIENCY IN SATELLITE SYSTEMS--The student will be able to:

06.01 Describe the operation of satellite systems.
06.02 Identify the components of satellite systems.

06.03 Describe the process of time division multiplexing and frequency division multiplexing used with satellite transponders.

06.04 Analyze, troubleshoot and adjust satellite transponder circuits using a high frequency sweep generator and frequency counter.

06.05 Analyze and troubleshoot video and audio demodulators in satellite receivers.

06.06 Determine location data for satellites.

06.07 Identify local codes and deed restrictions applicable to site surveys for satellite systems.

06.08 Set up and adjust satellite antenna systems.

06.09 Analyze and troubleshoot a satellite receiver low noise amplifier and down converter.

06.10 Describe procedures to interface satellite systems with two-way up link and down link communications equipment.

07.0 DEMONSTRATE PROFICIENCY IN VIDEO SYSTEMS--The student will be able to:

07.01 Analyze and adjust the composition of video signals.

07.02 Define the principles of video signal generation.

07.03 Describe the principles of video multiplex circuits.

07.04 Analyze and adjust black and white and color display circuits.

07.05 Analyze, troubleshoot and adjust the color component of a signal.

07.06 Analyze, troubleshoot and adjust the luminance component of a signal.

07.07 Analyze and troubleshoot the synchronous, horizontal and vertical components of a signal.

07.08 Measure the signal-to-noise ratio for video signals.

07.09 Analyze video circuits using a spectrum analyzer.

07.10 Interconnect video system components using coaxial cables.

07.11 Analyze, troubleshoot and adjust video and RF distribution systems.

07.12 Analyze and adjust a modulator for a video distribution system.

08.0 DEMONSTRATE PROFICIENCY IN COMMERCIAL AUDIO SYSTEMS--The student will be able to:

08.01 Describe the functions of communication system audio components.

08.02 Analyze, troubleshoot and adjust audio amplifier components and speaker system components.

08.03 Define the application of microphone and speaker systems.

08.04 Describe the application of wireless microphones with frequency diversity and the use of equalizers and time delay systems.

08.05 Determine the impedance and power requirements of microphones and speakers.

09.0 DEMONSTRATE PROFICIENCY IN DATA COMMUNICATIONS--The student will be able to:

09.01 Describe the operation of data communications systems.

09.02 Identify the components of data communications systems.

09.03 Analyze and define data communication codes, formats and protocols.
09.04 Identify serial and parallel ports and explain their use.
09.05 Describe the principles of synchronous and asynchronous data transmission systems.
09.06 Identify types of modems and modulation techniques.
09.07 Set up and operate modems.
09.08 Isolate problems of modem operation or common carrier lines.
09.09 Analyze and troubleshoot modems.
09.10 Identify and describe types of carrier systems.
09.11 Interconnect systems using the RS-232 interface standard.
09.12 Describe the operation and bus architecture of local area networks.
09.13 Analyze and troubleshoot base band and broad band local area networks.
09.14 Identify telephone terms and procedures for interfacing wire lines with data networks.
09.15 Analyze and troubleshoot the data communications systems associated with automatic teller machines and credit card readers.
09.16 Describe the operation of lasers used with data transmission.

10.0 DEMONSTRATE PROFICIENCY IN FIBER OPTIC COMMUNICATIONS SYSTEMS--The student will be able to:

10.01 Identify and describe the basic characteristics of optics such as reflection, refraction and total reflection.
10.02 Identify the characteristics and components of fiber optic cables.
10.03 Describe the modes of propagation used in fiber optic cables.
10.04 Identify bandwidth and attenuation limitations for fiber optic systems.
10.05 Describe the technique of wavelength multiplexing in fiber optic cables.
10.06 Identify and describe the characteristics of various types of light sources and light emitting diodes used for fiber optic systems.
10.07 Identify and describe the components of fiber optic transmission systems.
10.08 Assemble a simple fiber optic data transmission system.
10.09 Analyze and troubleshoot the components of fiber optic data transmission systems.
10.10 Describe the procedures used to interface fiber optic systems with microwave and satellite data transmission systems.

11.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

11.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
11.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
11.03 Read and follow written and oral instructions.

11.04 Answer and ask questions coherently and concisely.
11.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
11.06 Demonstrate appropriate telephone/communication skills.

12.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

12.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
12.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
12.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
12.05 Demonstrate an understanding of federal, state and local taxes and their computation.

13.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

13.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
13.02 Draw conclusions or make inferences from data.
13.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
13.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

14.01 Conduct a job search.
14.02 Secure information about a job.
14.03 Identify documents which may be required when applying for a job interview.
14.04 Complete a job application form correctly.
14.05 Demonstrate competence in job interview techniques.
14.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
14.07 Identify acceptable work habits.
14.08 Demonstrate knowledge of how to make appropriate job changes.
14.09 Demonstrate acceptable employee health habits.
14.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

15.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

15.01 Identify characteristics of the American enterprise system.
15.02 Define inflation and deflation.
15.03 Illustrate the basic economic questions facing any society.
15.04 Determine the results of a change in demand or a change in supply.

15.05 List factors which contribute to economic growth.

15.06 Identify characteristics of different types of business ownership.

15.07 Choose appropriate action in a situation requiring application of business ethics.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Computer Electronics Technology
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I470104**
CIP Number	0647.010400
Grade Level	30, 31
Length	1800 hours
Certification	COMP SVC @7 G
	ELECTRONIC @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as data processing equipment repairers (85705614) and computer service technicians (003.161-014). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content includes, but is not limited to, installation, programming, operation, maintenance and servicing of computer systems; and diagnosis and correction of operational problems in computers arising from mechanical, electrical or electronics malfunctions.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Computer Electronics industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students will use various types of precision test equipment for analyzing, troubleshooting and repairing computer circuitry.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan signed by the student, teacher and employer which includes instructional objectives and a list of on-the-

job and in-school learning experiences; and a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

Electronic Technology and/or Electronic Engineering Technology are prerequisites for entry into this electronic specialization. Algebra is recommended as a prerequisite for entry into this program.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 10.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1800 hours when content from the Florida common core electronics program (Electronics Technology) is included.

IV. **INTENDED OUTCOMES**: After successfully completing the program, this program, the student will be able to:

01.0 Demonstrate proficiency in computer systems architecture.
02.0 Demonstrate proficiency in software fundamentals.
03.0 Demonstrate proficiency in communication interfacing
04.0 Demonstrate proficiency in peripheral equipment.
05.0 Demonstrate proficiency in site requirements and considerations.
06.0 Demonstrate proficiency in customer relations.
07.0 Demonstrate appropriate communication skills.
08.0 Demonstrate appropriate math skills.
09.0 Demonstrate appropriate understanding of basic science.
10.0 Demonstrate employability skills.
11.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Computer Electronics Technology
Secondary Number:
Postsecondary Number: I470104

01.0 DEMONSTRATE PROFICIENCY IN COMPUTER SYSTEMS ARCHITECTURE--The student will be able to:

- 01.01 Draw and explain systems configurations in block detail.
- 01.02 Interpret computer acronyms.
- 01.03 Identify and define priorities and interrupts at system level.
- 01.04 Define and list direct memory access handling systems.
- 01.05 Define functions of advanced memory techniques (e.g. virtual, pipeline, cache).
- 01.06 Troubleshoot a microcomputer system.

02.0 DEMONSTRATE PROFICIENCY IN SOFTWARE FUNDAMENTALS--The student will be able to:

- 02.01 Load and run operating system software.
- 02.02 Load and run diagnostic software and utilities.
- 02.03 Construct flow charts.
- 02.04 Analyze flow charts.
- 02.05 Identify and define computer languages and their uses.
- 02.06 Write a simple computer program in BASIC.
- 02.07 Read a PROM.
- 02.08 Erase and program an EPROM.
- 02.09 Analyze firmware concepts.
- 02.10 Troubleshoot firmware using defined hardware.
- 02.11 Analyze firmware writing concepts.

03.0 DEMONSTRATE PROFICIENCY IN COMMUNICATION INTERFACING--The student will be able to:

- 03.01 Identify and define serial and parallel interface standards.
- 03.02 Identify, define and configure sync and async devices.
- 03.03 Demonstrate the use of interface devices.
- 03.04 Identify and define networking levels.
- 03.05 Identify and define protocols.
- 03.06 Troubleshoot and repair network systems.
- 03.07 Identify and define multiuser systems.

04.0 DEMONSTRATE PROFICIENCY IN PERIPHERAL EQUIPMENT--The student will be able to:

- 04.01 Install, analyze and troubleshoot interface controllers.
- 04.02 Install, analyze and troubleshoot display terminals.
- 04.03 Install, analyze and troubleshoot printer.
- 04.04 Install, analyze and troubleshoot magnetic tape equipment.
- 04.05 Install, analyze and troubleshoot disk drive equipment.
- 04.06 Define environmental requirements for peripherals and media.

05.0 DEMONSTRATE PROFICIENCY IN SITE REQUIREMENTS AND CONSIDERATIONS--The student will be able to:

05.01 Apply effective customer relations.
05.01 Follow installation procedures.
05.02 Calculate, and determine power requirements.
05.03 Calculate and determine environmental requirements.
05.04 List and perform preventative maintenance techniques and requirements.

06.0 DEMONSTRATE PROFICIENCY IN CUSTOMER RELATIONS--The student will be able to:

06.01 Describe effective listening techniques.
06.02 Describe techniques for instilling customer confidence.
06.03 Describe techniques for keeping the customer informed.
06.04 Demonstrate proper follow-up techniques.

07.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

07.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
07.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
07.03 Read and follow written and oral instructions.
07.04 Answer and ask questions coherently and concisely.
07.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
07.06 Demonstrate appropriate telephone/communication skills.

08.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

08.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
08.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
08.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
08.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
08.05 Demonstrate an understanding of federal, state and local taxes and their computation.

09.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

09.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
09.02 Draw conclusions or make inferences from data.
09.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

09.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

10.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

10.01 Conduct a job search.
10.02 Secure information about a job.
10.03 Identify documents which may be required when applying for a job interview.
10.04 Complete a job application form correctly.
10.05 Demonstrate competence in job interview techniques.
10.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
10.07 Identify acceptable work habits.
10.08 Demonstrate knowledge of how to make appropriate job changes.
10.09 Demonstrate acceptable employee health habits.
10.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

11.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

11.01 Identify characteristics of the American enterprise system.
11.02 Define inflation and deflation.
11.03 Illustrate the basic economic questions facing any society.
11.04 Determine the results of a change in demand or a change in supply.
11.05 List factors which contribute to economic growth.
11.06 Identify characteristics of different types of business ownership.
11.07 Choose appropriate action in a situation requiring application of business ethics.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Computer Engineering Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.040200
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT:** This program is designed to prepare students for employment as computer engineering technicians and in related occupations in electronics or to provide supplemental training for persons currently or previously employed in these occupations.

Electronic Technology and/or Electronic Engineering Technology (CORE) are prerequisites for entry into this electronic specialization program. The CORE program prepares individuals to assemble, install, operate, maintain, troubleshoot and repair electronic equipment used in industry. In addition, it also includes content related to the design, theory, and analysis of electronic systems and applications.

This specialization content includes, but is not limited to, computer systems architecture, software, communications, programming and analysis and design of computer systems.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Computer Engineering industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Electronic laboratory activities are an integral part of this program. The tools, test equipment, materials and processes used in this laboratory are similar to those used in industry. Students should be able to use the various types of precision test equipment found in general use throughout the electronics industry for the purpose of analyzing, troubleshooting and repairing computer circuitry.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

This general education requirement must have a minimum of 15 semester hours with at least one course in oral and written communication and one

course in computational skills. The computational skills should include algebra and trigonometry.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; and a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

When content from the Florida common core electronics program (Electronics Technology) is included, the typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in computer systems architecture.
02.0 Demonstrate proficiency in software fundamentals.
03.0 Demonstrate proficiency in communication interfacing.
04.0 Demonstrate proficiency in peripheral equipment.
05.0 Demonstrate proficiency in customer site requirements and considerations.
06.0 Demonstrate proficiency in customer relations.
07.0 Demonstrate proficiency with high-level computer programming languages.
08.0 Demonstrate proficiency in computer networking techniques.
09.0 Demonstrate proficiency in the use of microcomputer disk operating system services and functions.
10.0 Demonstrate proficiency in analysis and design of data communications systems.
11.0 Demonstrate proficiency in the analysis and design of peripheral equipment used in computer systems.
12.0 Demonstrate appropriate communication skills.
13.0 Demonstrate appropriate math skills.
14.0 Demonstrate appropriate understanding of basic science.
15.0 Demonstrate employability skills.
16.0 Demonstrate an understanding of entrepreneurship.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Computer Engineering Technology
Secondary Number:
Postsecondary Number: 0615.040200

01.0 DEMONSTRATE PROFICIENCY IN COMPUTER SYSTEMS ARCHITECTURE--The student will be able to:

- 01.01 Draw and explain systems configurations in block detail.
- 01.02 Interpret computer acronyms.
- 01.03 Identify and define priorities and interrupts at system level.
- 01.04 Define and list direct memory access handling systems.
- 01.05 Define functions of advanced memory techniques (e.g. virtual, pipeline, cache).
- 01.06 Troubleshoot a microcomputer system.

02.0 DEMONSTRATE PROFICIENCY IN SOFTWARE FUNDAMENTALS--The student will be able to:

- 02.01 Load and run operating system software.
- 02.02 Load and run diagnostic software and utilities.
- 02.03 Construct flow charts.
- 02.04 Analyze flow charts.
- 02.05 Identify and define computer languages and their uses.
- 02.06 Write a simple computer program in BASIC.
- 02.07 Read a PROM.
- 02.08 Erase and program an EPROM.
- 02.09 Analyze firmware concepts.
- 02.10 Troubleshoot firmware using defined hardware.
- 02.11 Analyze firmware writing concepts.

03.0 DEMONSTRATE PROFICIENCY IN COMMUNICATION INTERFACING--The student will be able to:

- 03.01 Identify and define serial and parallel interface standards.
- 03.02 Identify, define and configure sync and async devices.
- 03.03 Demonstrate the use of interface devices.
- 03.04 Identify and define networking levels.
- 03.05 Identify and define protocols.
- 03.06 Troubleshoot and repair network systems.
- 03.07 Identify and define multiuser systems.

04.0 DEMONSTRATE PROFICIENCY IN PERIPHERAL EQUIPMENT--The student will be able to:

- 04.01 Install, analyze and troubleshoot interface controllers.
- 04.02 Install, analyze and troubleshoot display terminals.
- 04.03 Install, analyze and troubleshoot printer.
- 04.04 Install, analyze and troubleshoot magnetic tape equipment.
- 04.05 Install, analyze and troubleshoot disk drive equipment.
- 04.06 Define environmental requirements for peripherals and media.

05.0 DEMONSTRATE PROFICIENCY IN CUSTOMER SITE REQUIREMENTS AND CONSIDERATIONS--The student will be able to:

05.01 Apply effective customer relations.
05.01 Follow installation procedures.
05.02 Calculate and determine power requirements.
05.03 Calculate and determine environmental requirements.
05.04 List and perform preventative maintenance techniques and requirements.

06.0 DEMONSTRATE PROFICIENCY IN CUSTOMER RELATIONS--The student will be able to:

06.01 Describe effective listening techniques.
06.02 Describe techniques for instilling customer confidence.
06.03 Describe techniques for keeping the customer informed.
06.04 Demonstrate proper follow-up techniques.

07.0 DEMONSTRATE PROFICIENCY WITH HIGH-LEVEL COMPUTER PROGRAMMING LANGUAGES--The student will be able to:

07.01 Write a technical program in a high-level programming language (e.g. Fortran, Cobol, Basic, C) and associated system level concepts.
07.02 Identify and define associated system level concepts.
07.03 Apply structured programming such as loop structures, sorting techniques, data structures and arithmetic operations.

08.0 DEMONSTRATE PROFICIENCY IN COMPUTER NETWORKING TECHNIQUES--The student will be able to:

08.01 Identify and define computer networking techniques.
08.02 Design a system using hardware and software communication protocols.
08.03 Apply management techniques for network software.

09.0 DEMONSTRATE PROFICIENCY IN THE USE OF MICROCOMPUTER DISK OPERATING SYSTEM SERVICES AND FUNCTIONS--The student will be able to:

09.01 Describe the historical development of computer operating systems.
09.02 Describe the major hardware and related software subsystems of microcomputer DOS (Disk Operating System).
09.03 Describe various disk formats.
09.04 Program using assembly language to access the ROM-BIOS (Read-Only Memory-Basic Input/Output System) feature for peripheral control and serial communications.
09.05 Describe the extended services of enhanced systems.
09.06 Describe design decisions involved in implementing Input/Output (I/O) interfacing using interrupts.
09.07 Program using assembly language to implement I/O device interfacing using interrupts.
09.08 Program using the extended DOS functions.

09.09 Analyze and design software systems using ROM-BIOS, DOS functions and interrupts for use in a multiplexed analog to digital system.

09.10 Analyze and design software systems using ROM-BIOS functions and interrupts for use in a synchronous digital data system.

10.0 DEMONSTRATE PROFICIENCY IN ANALYSIS AND DESIGN OF DATA COMMUNICATIONS SYSTEMS--The student will be able to:

10.01 Describe the different types of digital data communications systems.

10.02 Describe data formats and transmission rates in serial data communications systems.

10.03 Design the connections and programming for a UART (Universal Asynchronous/Synchronous Receiver Transmitter) in a microprocessor-based system.

10.04 Identify and define available options for integration of a display terminal in a data communication system.

10.05 Identify and define communication signals and protocol for MODEM (Modulator Demodulator) links.

10.06 Apply digital modulation techniques including PAM (Pulse-Amplitude Modulation), PCM (Pulse-Code Modulation), PWM (Pulse-Width Modulation) and delta modulation.

10.07 Analyze and design circuits for generation and detection of digital modulation.

10.08 Apply error detection and correction in digital communication systems.

10.09 Define communication protocols.

10.10 Design and apply multiplexing techniques for computer.

11.0 DEMONSTRATE PROFICIENCY IN THE ANALYSIS AND DESIGN OF PERIPHERAL EQUIPMENT USED IN COMPUTER SYSTEMS--The student will be able to:

11.01 Design and analyze circuits used in various functions of video display systems.

11.02 Analyze various types of disk drives and disk drive controllers.

11.03 Analyze various types of printers and plotters and their related interface controllers.

11.04 Analyze and design circuits for sweep generation and synchronization in a CRT (Cathode-Ray Tube) display.

11.05 Describe the use of RAM (Random-Access Memory) and ROM (Read-Only Memory) for font generation in video display systems.

11.06 Design the serial communication interface in a video.

11.07 Modulation and interval timing techniques.

11.08 Pointing devices for computer systems.

11.09 Analyze the operation of mechanical and optical pointing devices used in computer systems.

11.10 Describe the functions of the major blocks in a dot matrix printer.

11.11 Analyze and design circuits to communicate using a standard Centronics parallel interface in a printer.

11.12 Describe the main functional blocks of a roller bed plotter.

11.13 Analyze and design subsystems including interfaces for use in a roller bed plotter.

12.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

12.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
12.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
12.03 Read and follow written and oral instructions.
12.04 Answer and ask questions coherently and concisely.
12.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
12.06 Demonstrate appropriate telephone/communication skills.

13.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

13.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
13.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
13.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
13.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
13.05 Demonstrate an understanding of federal, state and local taxes and their computation.

14.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

14.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
14.02 Draw conclusions or make inferences from data.
14.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
14.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

15.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

15.01 Conduct a job search.
15.02 Secure information about a job.
15.03 Identify documents which may be required when applying for a job interview.
15.04 Complete a job application form correctly.
15.05 Demonstrate competence in job interview techniques.
15.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
15.07 Identify acceptable work habits.
15.08 Demonstrate knowledge of how to make appropriate job changes.

15.09 Demonstrate acceptable employee health habits.

15.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

16.01 Identify characteristics of the American enterprise system.

16.02 Define inflation and deflation.

16.03 Illustrate the basic economic questions facing any society.

16.04 Determine the results of a change in demand or a change in supply.

16.05 List factors which contribute to economic growth.

16.06 Identify characteristics of different types of business ownership.

16.07 Choose appropriate action in a situation requiring application of business ethics.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Computer Integrated Manufacturing Technology
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	N/A
	PSV
CIP Number	0615.049901
Grade Level	College Credit
Length	A.S. Degree

I. **PURPOSE**: This program is designed to prepare students for employment as automation equipment technicians (638.261-010) and in related occupations in electronics; or to provide supplemental training to persons previously or currently employed in these occupations.

Electronic Technology and/or Electronic Engineering Technology (CORE) are prerequisites for entry into this electronic specialization program. The CORE program prepares individuals to assemble, install, operate, maintain, troubleshoot and repair electronic equipment used in industry. In addition, it also includes content related to the design, theory, and analysis of electronic systems and applications.

This specialization content includes, but is not limited to, calibration of production line equipment, integration of controllers with workcells, bar code tracking systems, vision systems, retrieval systems, production planning operating and maintaining production equipment and test instruments, CIM systems analysis, data communications, CAD systems and quality assurance.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Computer Integrated Manufacturing industry; planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Electronic laboratory activities are an integral part of this program. The tools, test equipment, materials and processes used in this laboratory are similar to those used in industry. Students should be able to use the test equipment found in the laboratory in the electronics industry for the purpose of analyzing, troubleshooting and repairing electronics circuitry and automated equipment.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such

organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

This general education requirement must have a minimum of 15 semester hours with at least one course in oral and written communication and one course in computational skills. The computational skills should include algebra and trigonometry.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; and a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate in Science Degree.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in machines and mechanisms.
02.0 Demonstrate proficiency in manufacturing processes.
03.0 Demonstrate proficiency in operating and maintaining manufacturing equipment for automated assembly.
04.0 Demonstrate proficiency in evaluating the efficiency and performance of individual production line equipment.
05.0 Demonstrate proficiency in integrating production equipment with workcells, programmable logic controllers and area controllers.
06.0 Demonstrate proficiency in bar coding, automatic tracking vision systems and automatic storage and retrieval systems for materials handling.
07.0 Demonstrate proficiency in manufacturing software applications used for production planning, quality control and shop floor data collection.
08.0 Demonstrate proficiency in programming and controlling production machines in a flexible automation environment.
09.0 Demonstrate proficiency in operating and maintaining production test equipment and instruments.
10.0 Demonstrate proficiency in CIM systems analysis.
11.0 Demonstrate proficiency in installing, maintaining and understanding network and data communications devices.
12.0 Demonstrate proficiency in basic use of computer assisted drafting and design equipment used in a manufacturing environment.

13.0 Demonstrate proficiency in use of quality assurance methods and statistical process control techniques.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Computer Integrated Manufacturing Technology
Secondary Number:
Postsecondary Number: 0615.049901

01.0 DEMONSTRATE PROFICIENCY IN MACHINES AND MECHANISMS--The student will be able to:

- 01.01 Identify, define and analyze various electromechanical systems, including pneumatic, hydraulic and electrical.
- 01.02 Construct flow diagrams of electromechanical system.
- 01.03 Analyze and identify mechanical linkages (gears, pulleys, limit switches, etc.).
- 01.04 Analyze and identify electromechanical devices (motors, servos, relays, stepping switches, timing devices, etc.).
- 01.05 Analyze and identify sensing elements.
- 01.06 Analyze and identify optical canning and encoding/decoding devices.
- 01.07 Analyze and identify error sensing/feedback and control mechanisms.

02.0 DEMONSTRATE PROFICIENCY IN MANUFACTURING PROCESSES--The student will be able to:

- 02.01 Understand current manufacturing processes.
- 02.02 Understand the use of current manufacturing machines, operating systems and mechanisms.
- 02.03 Understand hydraulic, electrical and pneumatic devices used in production assembly and materials handling.
- 02.04 Understand OSHA, state, and local safety requirements for the manufacturing and assembly operations with automated equipment.
- 02.05 Understand manpower needs and skills needed in assembly operations.
- 02.06 Understand integration requirements for charging conventional manufacturing to CIM.
- 02.07 Understand the criteria for tool design, maintenance, procurement and handling.
- 02.08 Understand gage design, usage and limitations.
- 02.09 Understand the requirements and solutions for raw materials orientation and clamping.
- 02.10 Analyze and recommend the usage of jigs and fixtures, including effectors and special grippers for robotics.
- 02.11 Understand the concepts and considerations required for products manufactured from sheet metal.
- 02.12 Understand the special equipment required for sheet metal fabrication and forming.
- 02.13 Understand concepts of injection molding equipment.
- 02.14 Understand the concepts involved in the process of designing and fabricating specialized tools for numerical controlled machine application.

02.15 Understand the concepts and special considerations involved with operating computer numerical control equipment.

02.16 Understand the functions of the industrial computer and microprocessor controls in modern manufacturing.

03.0 DEMONSTRATE PROFICIENCY IN OPERATING AND MAINTAINING MANUFACTURING EQUIPMENT FOR AUTOMATED ASSEMBLY--The student will be able to:

03.01 Interpret blueprints, schematics and technical manuals.
03.02 Establish routine operations involving maintenance schedules.
03.03 Analyze system failures.
03.04 Perform minor repairs to CIM systems.
03.05 Coordinate and specify maintenance service.
03.06 Evaluate need for equipment replacement, overhaul and retooling.

04.0 DEMONSTRATE PROFICIENCY IN EVALUATING THE EFFICIENCY AND PERFORMANCE OF INDIVIDUAL PRODUCTION LINE EQUIPMENT--The student will be able to:

04.01 Design the routing, storage and procurement/distribution systems for raw and finished products.
04.02 Analyze and utilize statistical data from process control systems.
04.03 Describe the relationship of equipment utilization to the manufacturing economy.
04.04 Prepare and evaluate justifications for specification deviations.

05.0 DEMONSTRATE PROFICIENCY IN INTEGRATING PRODUCTION EQUIPMENT WITH WORKCELLS, PROGRAMMABLE LOGIC CONTROLLERS AND AREA CONTROLLERS--The student will be able to:

05.01 Design analog and digital control systems along with applicable software to specific manufacturing requirements.
05.02 Chart and analyze ladder logic diagrams for manufacturing processes.
05.03 Develop and analyze flow charts from ladder diagrams and related process controls.
05.04 Operate Programmable Logic Controllers with device drivers.
05.05 Apply software to workcells and area controllers.
05.06 Integrate control systems and equipment with production and production support mechanisms.

06.0 DEMONSTRATE PROFICIENCY IN BAR CODING, AUTOMATIC TRACKING VISION SYSTEMS AND AUTOMATIC STORAGE AND RETRIEVAL SYSTEMS FOR MATERIALS HANDLING--The student will be able to:

06.01 Describe automatic inventory accounting and control system.
06.02 List the underlying principles and method of controlling work in progress.
06.03 Analyze product flow cycle.
06.04 Describe warehouse throughput systems.
06.05 Implement automated tracking in the laboratory environment.
06.06 Describe machine vision applications.

06.07 Maintain machine vision and sensing system equipment.

07.0 DEMONSTRATE PROFICIENCY IN MANUFACTURING SOFTWARE APPLICATIONS USED FOR PRODUCTION PLANNING, QUALITY CONTROL AND SHOP FLOOR DATA COLLECTION--The student will be able to:

07.01 Apply proficiency in manufacturing software application packages.
07.02 Analyze data collection systems for maintaining the progress of each order.
07.03 Assign and maintain priorities of individual orders.

08.0 DEMONSTRATE PROFICIENCY IN PROGRAMMING AND CONTROLLING PRODUCTION MACHINES IN A FLEXIBLE AUTOMATION ENVIRONMENT--The student will be able to:

08.01 Define and analyze product manufacturing requirements and process.
08.02 Identify the responsibilities of management in produced production.
08.03 Integrate personnel, hardware and software capabilities for the timely completion of product manufacturing.
08.04 Describe the relationship of quality assurance and manufacturing.
08.05 Apply the basic principles underlying the relationship between systems design, production and manufacturing engineering.
08.06 Apply manufacturing simulation packages used in layout and design of production operations.
08.07 Apply manufacturing resources planning and just-in-time concepts in production planning operations.
08.08 Apply engineering economy factors in equipment justification.
08.09 Apply microprocessor controls to a modern manufacturing system.

09.0 DEMONSTRATE PROFICIENCY IN OPERATING AND MAINTAINING PRODUCTION TEST EQUIPMENT AND INSTRUMENTS--The student will be able to:

09.01 Specify, interconnect and operate instruments and test equipment.
09.02 Analyze normal and abnormal instrument readings and their probable causes.
09.03 Specify and operate Automatic Test Equipment (ATE) procedures, using required software and hardware.
09.04 Troubleshoot control systems mechanisms and software.
09.05 Repair faults in production equipment and specify external repairs or overhaul requirements.
09.06 Align, calibrate and maintain related ATE interfaces and circuits.
09.07 Prepare error probability charts and graphs.

10.0 DEMONSTRATE PROFICIENCY IN CIM SYSTEMS ANALYSIS--The student will be able to:

10.01 Describe the concepts of a generic CIM system.

10.02 Analyze and identify problems with the operation of industrial computers, controllers and hardware.

10.03 Utilize typical screens and files available to shop floor operations for troubleshooting and data collection.

10.04 Operate industrial terminals, input/output communications interface devices, etc., found in the manufacturing environment.

11.0 DEMONSTRATE PROFICIENCY IN INSTALLING, MAINTAINING AND UNDERSTANDING NETWORK AND DATA COMMUNICATIONS DEVICES--The student will be able to:

11.01 Identify and apply communications protocols.

11.02 Identify and apply networks and classifications.

11.03 Identify and apply throughput, memory size/capabilities and standards benchmark.

11.04 Identify and apply computer options for sharing directories, files and servers.

11.05 Select and apply sensors and feedback devices.

11.06 Select and interconnect cabling, repeaters, modems and multiplexers.

12.0 DEMONSTRATE PROFICIENCY IN BASIC USE OF COMPUTER ASSISTED DRAFTING AND DESIGN EQUIPMENT USED IN A MANUFACTURING ENVIRONMENT--The student will be able to:

12.01 Operate CAD systems and hardware.

12.02 Apply CAD support software to manipulate interval files, attributes, database exchange files, and set-up.

12.03 Apply CAD software to create, edit, and update drawings and files.

12.04 Identify and define protocols and software used to download CAD to CAM.

12.05 Describe the relationship and functions of CAD in the industrial production environment.

13.0 DEMONSTRATE PROFICIENCY IN USE OF QUALITY ASSURANCE METHODS AND STATISTICAL PROCESS CONTROL TECHNIQUES--The student will be able to:

13.01 Describe the concept of quality assurance in increasing productivity and promoting zero defects.

13.02 Apply data collection methods for productivity improvement and reporting.

13.03 Analyze productivity data, identify problem areas and evaluate the cause and effect relationship.

13.04 Develop and apply quality improvement strategies.

13.05 Develop and apply QA methods and techniques for production and product handling in a CIM environment.

13.06 Understand process capability and its applications.

13.07 Use statistical quality control (SQC) tools and techniques to analyze data.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Consumer Electronic Product Servicing
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I470113**
CIP Number	0647.019900
Grade Level	30, 31
Length	1800 hours
Certification	RADIO TV @7 G
	ELECTRONIC @7 G
	TEC ELEC @7 G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as home entertainment equipment repairers (85708616) or audio video repairers (729.281-010). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content includes, but is not limited to, AM/FM tuners; television; antenna, transmission line systems and studio systems; and television. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Electronic industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students will use various types of precision test equipment for analyzing, troubleshooting and repairing computer circuitry found in audio systems, tape recorders, tuners, televisions, video disc players, master antenna systems and electronic security systems

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction is appropriate for this program. Whenever the cooperative method is offered, the following is required for each student: a training agreement, a training plan signed by the student, teacher and employer, including instructional objectives and a

list of on-the-job and in-school learning experiences and a work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must be paid for work performed.

Electronic Technology and/or Electronic Engineering Technology are prerequisites for entry into this electronic specialization. Algebra is recommended as a prerequisite for entry into this program.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 10.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The standard credit hour length for this program is according to SBR 6A-14.030.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in surface mounted devices.
02.0 Demonstrate proficiency repairing radio and television receiving systems.
03.0 Demonstrate proficiency in video recording and playback systems.
04.0 Demonstrate proficiency in video disc player systems.
05.0 Demonstrate proficiency in personal computer systems and video games.
06.0 Demonstrate proficiency in advanced audio systems (analog and digital).
07.0 Demonstrate proficiency in master antenna television systems (CATV/CCTV/MATV/SATV).
08.0 Demonstrate proficiency in electronic security systems.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate appropriate math skills.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate employability skills.
13.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Consumer Electronic Product Servicing
Secondary Number:
Postsecondary Number: I470113

01.0 DEMONSTRATE PROFICIENCY IN SURFACE MOUNTED DEVICES (SMD)--The student will be able to:

- 01.01 Identify types of surface mounted devices (SMD's) for DC, AC and solid-state circuits.
- 01.02 Identify defective SMD's using appropriate troubleshooting techniques.
- 01.03 Remove and replace SMD's using specialized soldering and desoldering techniques.
- 01.04 Properly handle static sensitive devices.

02.0 DEMONSTRATE PROFICIENCY IN RADIO AND TELEVISION RECEIVING SYSTEMS--The student will be able to:

- 02.01 Read and interpret radio and television receiving system block and circuit diagrams.
- 02.02 Determine the operational status of radio and television receiving systems.
- 02.03 Troubleshoot radio and television receiving systems.
- 02.04 Remove and replace radio and television receiving system components.
- 02.05 Perform operating systems check and make minor adjustments to radio and television receiving systems.
- 02.06 Set up and operate video analyzers.
- 02.07 Set up and operate National Television Signal Codes (NTSC) generators.
- 02.08 Set up and operate cathode ray tube (CRT) analyzers.
- 02.09 Set up and operate stereo generators.

03.0 DEMONSTRATE PROFICIENCY IN VIDEO RECORDING AND PLAYBACK SYSTEMS (ANALOG AND DIGITAL)--The student will be able to:

- 03.01 Read and interpret video recording system block and circuit diagrams.
- 03.02 Determine the operational status of video recording systems (mechanical and electronic).
- 03.03 Troubleshoot video recording systems.
- 03.04 Remove and replace video recording system components.
- 03.05 Perform operating systems check and make minor adjustments to video recording systems.
- 03.06 Set up and operate BETA test equipment.
- 03.07 Set up and operate VHS test equipment.
- 03.08 Set up and operate vectorscopes.

04.0 DEMONSTRATE PROFICIENCY IN VIDEO DISC PLAYER SYSTEMS--The student will be able to:

04.01 Read and interpret video disc player system block and circuit diagrams.
04.02 Determine the operational status of video disc player systems.
04.03 Troubleshoot video disc player systems.
04.04 Remove and replace video disc player system components.
04.05 Perform operating systems checks and make minor adjustments to video disc player systems.

05.0 DEMONSTRATE PROFICIENCY IN PERSONAL COMPUTER SYSTEMS AND VIDEO GAMES--The student will be able to:

05.01 Read and interpret computer system and video game block and circuit diagrams.
05.02 Determine the operational status of personal computer systems and video games.
05.03 Troubleshoot personal computer systems and video games.
05.04 Remove and replace personal computer systems and video game components.
05.05 Perform operating systems check and make minor adjustments to personal computer systems and video games.
05.06 Set up and operate logic analyzers for personal computer systems.

06.0 DEMONSTRATE PROFICIENCY IN ADVANCED AUDIO SYSTEMS (ANALOG AND DIGITAL)--The student will be able to:

06.01 Read and interpret advanced audio systems block and circuit diagrams.
06.02 Determine the operational status of advanced audio systems.
06.03 Troubleshoot advanced audio systems.
06.04 Remove and replace advanced audio system components.
06.05 Perform operating systems check and make minor adjustments to advanced audio systems.

07.0 DEMONSTRATE PROFICIENCY IN MASTER ANTENNA TELEVISION SYSTEMS (CATV/CCTV/MATV/SATV)--The student will be able to:

07.01 Design master antenna television receiving systems.
07.02 Determine material requirements for master antenna television receiving systems.
07.03 Prepare bills of material for master antenna television receiving systems.
07.04 Lay out and install master antenna television receiving systems.
07.05 Set up and operate field strength meters.
07.06 Determine the operational status of master antenna television receiving systems.
07.07 Troubleshoot master antenna television receiving systems.
07.08 Remove and replace master antenna television receiving system components.
07.09 Perform operating systems check and make minor adjustments to master antenna television receiving systems.

08.0 DEMONSTRATE PROFICIENCY IN ELECTRONIC SECURITY SYSTEMS--The student will be able to:

- 08.01 Lay out and install electronic security systems.
- 08.02 Determine the operating status of electronic security systems.
- 08.03 Troubleshoot electronic security systems.
- 08.04 Remove and replace electronic security system components.
- 08.05 Perform operating systems check and make minor adjustments to electronic security systems.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 09.03 Read and follow written and oral instructions.
- 09.04 Answer and ask questions coherently and concisely.
- 09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 11.02 Draw conclusions or make inferences from data.
- 11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 12.01 Conduct a job search.
- 12.02 Secure information about a job.

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12.03 Identify documents which may be required when applying for a job interview.
12.04 Complete a job application for correctly.
12.05 Demonstrate competence in job interview techniques.
12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
12.07 Identify acceptable work habits.
12.08 Demonstrate knowledge or how to make appropriate job changes.
12.09 Demonstrate acceptable employee health habits.
12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Identify characteristics of the American enterprise system.
13.02 Define inflation and deflation.
13.03 Illustrate the basic economic questions facing any society.
13.04 Determine the results of a change in demand or a change in supply.
13.05 List factors which contribute to economic growth.
13.06 Identify characteristics of different types of business ownership.
13.07 Choose appropriate action in a situation requiring application of business ethics.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Consumer Electronic Repair
Occupational Area:	Industrial Education
	Secondary
Program Numbers	**8730100**
CIP Number	0647.019904
Grade Level	9-12, 30, 31
Length	6 credits
Certification	RADIO TV @7 G
	ELECTRONIC @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as radio mechanics (85514608) and radio and television repairers (ŦŦ20.281-018). This program also provides supplemental training for persons previously or currently employed in this occupation.

This program includes competencies of the common core of electronics program.

The course content will include the following: direct current (DC) electronics and circuits; alternating current (AC) electronics and circuits; solid-state devices and circuits; analog circuits; digital devices and circuits; microprocessing; technical recording and reporting; audio systems, AM/FM tuners, television and antenna systems.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

Listed below are the courses that make up this program when offered at the secondary level.

8730110 - Consumer Electronic Repair 1
8730120 - Consumer Electronic Repair 2
8730130 - Consumer Electronic Repair 3
8730140 - Consumer Electronic Repair 4
8730150 - Consumer Electronic Repair 5
8730160 - Consumer Electronic Repair 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Electronic industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, test equipment, materials and processes found in industry.

Students will use various types of precision test equipment for analyzing, troubleshooting and repairing computer circuitry found in audio systems, tape recorders, tuners and televisions.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

Algebra is recommended as a prerequisite for entry into this program.

The outcomes and student performance standards which the handicapped student must master must be specified in each student's Individual Education Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in laboratory practices.
02.0 Demonstrate proficiency in direct current (DC) circuits.
03.0 Demonstrate proficiency in alternating current (AC) circuits.
04.0 Demonstrate proficiency in solid-state devices.
05.0 Demonstrate proficiency in analog circuits.
06.0 Demonstrate proficiency in digital circuits.
07.0 Demonstrate proficiency in microprocessor systems.
08.0 Demonstrate proficiency in technical recording and reporting.
09.0 Demonstrate proficiency in surface mounted devices (SMD).
10.0 Demonstrate proficiency repairing radio and television receiving systems.
11.0 Demonstrate appropriate communication skills.
12.0 Demonstrate appropriate math skills.
13.0 Demonstrate appropriate understanding of basic science.
14.0 Demonstrate employability skills.
15.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Consumer Electronic Repair
Secondary Number: 8730100
Postsecondary Number:

01.0 DEMONSTRATE PROFICIENCY IN LABORATORY PRACTICE--The student will be able to:

- 01.01 Apply proper OSHA safety standards.
- 01.02 Make electrical connections.
- 01.03 Identify and use hand tools properly.
- 01.04 Identify and use power tools properly.
- 01.05 Demonstrate acceptable soldering and desoldering techniques.

02.0 DEMONSTRATE PROFICIENCY IN DIRECT CURRENT (DC) CIRCUITS--The student will be able to:

- 02.01 Solve algebraic problems to include exponentials (prerequisite to DC).
- 02.02 Solve problems in electronic units utilizing metric prefixes.
- 02.03 Relate electricity to the nature of matter.
- 02.04 Identify sources of electricity.
- 02.05 Define voltage, current, resistance, power and energy.
- 02.06 Apply Ohm's law and power formulas.
- 02.07 Read and interpret color codes and symbols to identify electrical components and values.
- 02.08 Measure properties of circuit using volt-ohm meter (VOM) and digital volt-ohm meter (DVM) and oscilloscopes.
- 02.09 Compute conductance and measure resistance of conductors and insulators.
- 02.10 Apply Ohm's law to series circuits.
- 02.11 Construct and verify operation of series circuits.
- 02.12 Analyze and troubleshoot series circuits.
- 02.13 Apply Ohm's law to parallel circuits.
- 02.14 Construct and verify the operation of parallel circuits.
- 02.15 Analyze and troubleshoot parallel circuits.
- 02.16 Apply Ohm's law to series-parallel and parallel-series circuits.
- 02.17 Construct and verify the operation of series-parallel and parallel-series and bridge circuits.
- 02.18 Troubleshoot series-parallel and parallel-series and bridge circuits.
- 02.19 Identify and define voltage divider circuits (loaded and unloaded).
- 02.20 Construct and verify the operation of voltage divider circuits (loaded and unloaded).
- 02.21 Analyze and troubleshoot voltage divider circuits (loaded and unloaded).
- 02.22 Apply maximum power transfer theory.
- 02.23 Construct and verify the operation of DC circuits that demonstrate the maximum power transfer theory.

02.24 Describe magnetic properties of circuits and devices.
02.25 Determine the physical and electrical characteristics of capacitors and inductors.
02.26 Define reactive-capacitance (R-C) and inductive-reactance (R-L) time constants and classify the output of differentiators and integrators.
02.27 Set up and operate power supplies for DC circuits.

03.0 DEMONSTRATE PROFICIENCY IN ALTERNATING CURRENT (AC) CIRCUITS--The student will be able to:

03.01 Solve basic trigonometric problems as applicable to electronics (prerequisite to AC).
03.02 Identify properties of an AC signal.
03.03 Identify AC sources.
03.04 Analyze and measure AC signals utilizing VOM, DVM, oscilloscope, frequency counter and function generator.
03.05 Define the characteristics of AC capacitive circuits.
03.06 Construct and verify the operation of AC capacitive circuits.
03.07 Analyze and troubleshoot AC capacitive circuits.
03.08 Define the characteristics of AC inductive circuits.
03.09 Construct and verify the operation of AC inductive circuits.
03.10 Analyze and troubleshoot AC inductive circuits.
03.11 Define and apply the principles of transformers to AC circuits.
03.12 Construct and verify the operation of AC circuits utilizing transformers.
03.13 Analyze and troubleshoot AC circuits utilizing transformers.
03.14 Construct and verify the operation of differentiators and integrators to determine R-C and R-L time constraints.
03.15 Analyze and troubleshoot differentiator and integrator circuits.
03.16 Define the characteristics of resistance inductance capacitance (RLC) circuits (series, parallel and complex).
03.17 Construct and verify the operation of RLC circuits (series, parallel and complex).
03.18 Define the characteristics of series and parallel resonant circuits.
03.19 Construct and verify the operation of series and parallel resonant circuits.
03.20 Analyze and troubleshoot R-C, R-L and RLC circuits.
03.21 Define the characteristics of frequency selective filter circuits.
03.22 Construct and verify the operation of frequency selective filter circuits.
03.23 Analyze and troubleshoot frequency selective filter circuits.
03.24 Define the characteristics of polyphase circuits.
03.25 Define basic motor theory and operation.
03.26 Define basic generator theory and operation.
03.27 Set up and operate power supplies for AC circuits.
03.28 Analyze and measure power in AC circuits.
03.29 Set up and operate capacitor and inductor analyzers for AC circuits.

04.0 DEMONSTRATE PROFICIENCY IN SOLID-STATE DEVICES--The student will be able to:

04.01 Identify and define properties of semiconductor materials.
04.02 Identify and define operating characteristics and applications of junction diodes.
04.03 Identify and define operating characteristics and application of special diodes.
04.04 Construct diode circuits.
04.05 Analyze and troubleshoot diode circuits.
04.06 Identify and define operating characteristics and applications of bipolar transistors.
04.07 Identify and define operating characteristics and applications of field effect transistors.
04.08 Identify and define operating characteristics and applications of single-stage amplifiers.
04.09 Construct single-stage amplifiers.
04.10 Analyze and troubleshoot single-stage amplifiers.
04.11 Construct thyristor circuitry.
04.12 Analyze and troubleshoot thyristor circuitry.
04.13 Set up and operate a VOM for solid-state devices.
04.14 Set up and operate a DVM for sold-state devices.
04.15 Set up and operate power supplies for sold-state devices.
04.16 Set up and operate oscilloscopes for solid-state devices.
04.17 Set up and operate function generators for solid-state devices.
04.18 Set up and operate capacitor and inductor analyzers for sold-state devices.
04.19 Set up and operate curve tracers.
04.20 Set up and operate transistor testers.

05.0 DEMONSTRATE PROFICIENCY IN ANALOG CIRCUITS--The student will be able to:

05.01 Identify and define operational characteristics and applications of multistage amplifiers.
05.02 Construct multistage amplifiers.
05.03 Analyze and troubleshoot multistage amplifiers.
05.04 Identify and define operating characteristics and applications of liner integrated circuits.
05.05 Identify and define operating characteristics and applications of basic power supplies and filters.
05.06 Construct basic power supplies and filters.
05.07 Troubleshoot basic power supplies and filters.
05.08 Identify and define operating characteristics and applications of differential and operational amplifiers.
05.09 Construct differential and operational amplifier circuits.
05.10 Analyze and troubleshoot differential and operational amplifier circuits.
05.11 Identify and define operating characteristics of audio power amplifiers.
05.12 Construct audio power amplifiers.
05.13 Analyze and troubleshoot audio power amplifiers.
05.14 Identify and define operating characteristics and applications of power supply regulator circuits.
05.15 Construct power supply regulator circuits.

05.16 Analyze and troubleshoot power supply regulator circuits.
05.17 Identify and define operating characteristics and applications of active filters.
05.18 Construct active filter circuits.
05.19 Analyze and troubleshoot active filter circuits.
05.20 Identify and define operating characteristics and applications of sinusoidal and nonsinusoidal oscillator circuits.
05.21 Construct oscillator circuits.
05.22 Analyze and troubleshoot oscillator circuits.
05.23 Identify and define operating characteristics and applications of motor phase-shift control circuits (single-phase and multiphase).
05.24 Identify and define operating characteristics and applications of cathode ray tubes.
05.25 Identify and define operating characteristics and applications of optoelectronic devices.
05.26 Set up and operate measuring instruments for analog circuits.

06.0 DEMONSTRATE PROFICIENCY IN DIGITAL CIRCUITS--The student will be able to:

06.01 Define and apply numbering systems to codes and arithmetic operations.
06.02 Analyze and minimize logic circuits using Boolean operations.
06.03 Set up and operate logic probes for digital circuits.
06.04 Set up and operate power supplies for digital circuits and solve power distribution and noise problems.
06.05 Set up and operate pulsers for digital circuits.
06.06 Set up and operate oscilloscopes for digital circuits.
06.07 Set up and operate logic analyzers for digital circuits.
06.08 Set up and operate pulse generators for digital, circuits.
06.09 Identify types of logic gates and their truth tables.
06.10 Construct combinational logic circuits using integrated circuits.
06.11 Troubleshoot logic circuits.
06.12 Analyze types of flip-flops and their truth tables.
06.13 Construct flip-flops using integrated circuits.
06.14 Troubleshoot flip-flops.
06.15 Identify, define and measure characteristics of integrated circuit (IC) logic families.
06.16 Identify types of registers and counters.
06.17 Construct registers and counters using flip-flops and logic gates.
06.18 Troubleshoot registers and counters.
06.19 Analyze clock and timing circuits.
06.20 Construct clock and timing circuits.
06.21 Troubleshoot clock and timing circuits.
06.22 Identify types of arithmetic-logic circuits.
06.23 Construct arithmetic-logic circuits.
06.24 Troubleshoot arithmetic-logic circuits.
06.25 Identify types of encoding and decoding devices.
06.26 Construct encoders and decoders.
06.27 Troubleshoot encoders and decoders.
06.28 Identify types of multiplexer and demultiplexer circuits.

06.29 Construct multiplexer and demultiplexer circuits using integrated circuits.
06.30 Troubleshoot multiplexer and demultiplexer circuits.
06.31 Identify types of memory circuits.
06.32 Relate the uses of digital-to-analog and analog-to-digital conversions.
06.33 Construct digital-to-analog and analog-to-digital circuits.
06.34 Troubleshoot digital-to-analog-and analog-to-digital circuits.
06.35 Identify types of digital displays.
06.36 Construct digital display circuits.
06.37 Troubleshoot digital display circuits.

07.0 DEMONSTRATE PROFICIENCY IN MICROPROCESSOR SYSTEMS--The student will be able to:

07.01 Identify central processing unit (CPU) building blocks and their uses (architecture).
07.02 Analyze bus concepts.
07.03 Analyze various memory schemes.
07.04 Use memory devices in circuits.
07.05 Troubleshoot memory device circuits.
07.06 Setup and operate oscilloscopes of microprocessor systems.
07.07 Setup and operate logic-date analyzers for troubleshooting microprocessor systems.
07.08 Identify types of input and output devices and peripherals.
07.09 Interface input and output ports to peripherals.
07.10 Analyze and troubleshoot input and output ports.
07.11 Execute computer instruction sets.

08.0 DEMONSTRATE PROFICIENCY IN TECHNICAL RECORDING AND REPORTING--The student will be able to:

08.01 Draw and interpret electronic schematics.
08.02 Record data and design curves and graphs.
08.03 Write reports and make oral presentations.
08.04 Maintain test logs.
08.05 Make equipment failure reports.
08.06 Specify and requisition simple electronic components.
08.07 Compose technical letters and memoranda.
08.08 Write formal reports of laboratory experiences.
08.09 Draft preventive maintenance and calibration procedures.

09.0 DEMONSTRATE PROFICIENCY IN SURFACE MOUNTED DEVICES (SMD)--The student will be able to:

09.01 Identify types of surface mounted devices (SMD's) for DC, AC and solid-state circuits.
09.02 Identify defective SMD's using appropriate troubleshooting techniques.
09.03 Remove and replace SMD's using specialized soldering and desoldering techniques.
09.04 Handle static sensitive devices.

10.0 DEMONSTRATE PROFICIENCY IN RADIO AND TELEVISION RECEIVING SYSTEMS--The student will be able to:

10.01 Read and interpret radio and television receiving system block and circuit diagrams.
10.02 Determine the operational status of radio and television receiving systems.
10.03 Troubleshoot radio and television receiving systems.
10.04 Remove and replace radio and television receiving system components.
10.05 Perform operating systems check and make minor adjustments to radio and television receiving systems.
10.06 Set up and operate video analyzers.
10.07 Set up and operate National Television Signal Codes (NTSC) generators.
10.08 Set up and operate cathode ray tube (CRT) analyzers.
10.09 Set up and operate stereo generators.

11.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

11.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
11.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
11.03 Read and follow written and oral instructions.
11.04 Answer and ask questions coherently and concisely.
11.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
11.06 Demonstrate appropriate telephone/communication skills.

12.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

12.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
12.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
12.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
12.05 Demonstrate an understanding of federal, state and local taxes and their computation.

13.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

13.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
13.02 Draw conclusions or make inferences from data.
13.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

13.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

14.01 Conduct a job search.
14.02 Secure information about a job.
14.03 Identify documents that may be required when applying for a job.
14.04 Complete a job application form correctly.
14.05 Demonstrate competence in job interview techniques.
14.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
14.07 Identify acceptable work habits.
14.08 Demonstrate knowledge of how to make job changes appropriately.
14.09 Demonstrate acceptable employee health habits.
14.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

15.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

15.01 Define entrepreneurship.
15.02 Describe the importance of entrepreneurship to the American economy.
15.03 List the advantages and disadvantages of business ownership.
15.04 Identify the risks involved in ownership of a business.
15.05 Identify the necessary personal characteristics of a successful entrepreneur.
15.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8730110
Course Title: Consumer Electronic Repair 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in laboratory practices and DC circuits.

01.0 DEMONSTRATE PROFICIENCY IN LABORATORY PRACTICE--The student will be able to:

- 01.01 Apply proper OSHA safety standards.
- 01.02 Make electrical connections.
- 01.03 Identify and use hand tools properly.
- 01.04 Identify and use power tools properly.
- 01.05 Demonstrate acceptable soldering and desoldering techniques.

02.0 DEMONSTRATE PROFICIENCY IN DIRECT CURRENT (DC) CIRCUITS--The student will be able to:

- 02.01 Solve algebraic problems to include exponentials (prerequisite to DC).
- 02.02 Solve problems in electronic units utilizing metric prefixes.
- 02.03 Relate electricity to the nature of matter.
- 02.04 Identify sources of electricity.
- 02.05 Define voltage, current, resistance, power and energy.
- 02.06 Apply Ohm's law and power formulas.
- 02.07 Read and interpret color codes and symbols to identify electrical components and values.
- 02.08 Measure properties of circuit using volt-ohm meter (VOM) and digital volt-ohm meter (DVM) and oscilloscopes.
- 02.09 Compute conductance and measure resistance of conductors and insulators.
- 02.10 Apply Ohm's law to series circuits.
- 02.11 Construct and verify operation of series circuits.
- 02.12 Analyze and troubleshoot series circuits.
- 02.13 Apply Ohm's law to parallel circuits.
- 02.14 Construct and verify the operation of parallel circuits.
- 02.15 Analyze and troubleshoot parallel circuits.
- 02.16 Apply Ohm's law to series-parallel and parallel-series circuits.
- 02.17 Construct and verify the operation of series-parallel and parallel series and bridge circuits.
- 02.18 Troubleshoot series-parallel and parallel-series and bridge circuits.
- 02.19 Identify and define voltage divider circuits (loaded and unloaded).

02.20 Construct and verify the operation of voltage divider circuits (loaded and unloaded).

02.21 Analyze and troubleshoot voltage divider circuits (loaded and unloaded).

02.22 Apply maximum power transfer theory.

02.23 Construct and verify the operation of DC circuits that demonstrate the maximum power transfer theory.

02.24 Describe magnetic properties of circuits and devices.

02.25 Determine the physical and electrical characteristics of capacitors and inductors.

02.26 Define reactive-capacitance (R-C) and inductive-reactance (R-L) time constants and classify the output of differentiators and integrators.

02.27 Set up and operate power supplies for DC circuits.

12.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

12.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

12.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

12.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

12.05 Demonstrate an understanding of federal, state and local taxes and their computation.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8730120
Course Title: Consumer Electronic Repair 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in AC circuits.

03.0 DEMONSTRATE PROFICIENCY IN ALTERNATING CURRENT (AC) CIRCUITS--The student will be able to:

03.01 Solve basic trigonometric problems as applicable to electronics (prerequisite to AC).
03.02 Identify properties of an AC signal.
03.03 Identify AC sources.
03.04 Analyze and measure AC signals utilizing VOM, DVM, oscilloscope, frequency counter and function generator.
03.05 Define the characteristics of AC capacitive circuits.
03.06 Construct and verify the operation of AC capacitive circuits.
03.07 Analyze and troubleshoot AC capacitive circuits.
03.08 Define the characteristics of AC inductive circuits.
03.09 Construct and verify the operation of AC inductive circuits.
03.10 Analyze and troubleshoot AC inductive circuits.
03.11 Define and apply the principles of transformers to AC circuits.
03.12 Construct and verify the operation of AC circuits utilizing transformers.
03.13 Analyze and troubleshoot AC circuits utilizing transformers.
03.14 Construct and verify the operation of differentiators and integrators to determine R-C and R-L time constraints.
03.15 Analyze and troubleshoot differentiator and integrator circuits.
03.16 Define the characteristics of resistance inductance capacitance (RLC) circuits (series, parallel and complex).
03.17 Construct and verify the operation of RLC circuits (series, parallel and complex).
03.18 Define the characteristics of series and parallel resonant circuits.
03.19 Construct and verify the operation of series and parallel resonant circuits.
03.20 Analyze and troubleshoot R-C, R-L and RLC circuits.
03.21 Define the characteristics of frequency selective filter circuits.
03.22 Construct and verify the operation of frequency selective filter circuits.
03.23 Analyze and troubleshoot frequency selective filter circuits.
03.24 Define the characteristics of polyphase circuits.
03.25 Define basic motor theory and operation.
03.26 Define basic generator theory and operation.
03.27 Set up and operate power supplies for AC circuits.

03.28 Analyze and measure power in AC circuits.

03.29 Set up and operate capacitor and inductor analyzers for AC circuits.

13.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

13.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

13.02 Draw conclusions or make inferences from data.

13.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

13.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8730130
Course Title: Consumer Electronic Repair 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in solid-state devices and analog circuits.

04.0 DEMONSTRATE PROFICIENCY IN SOLID-STATE DEVICES--The student will be able to:

- 04.01 Identify and define properties of semiconductor materials.
- 04.02 Identify and define operating characteristics and applications of junction diodes.
- 04.03 Identify and define operating characteristics and application of special diodes.
- 04.04 Construct diode circuits.
- 04.05 Analyze and troubleshoot diode circuits.
- 04.06 Identify and define operating characteristics and applications of bipolar transistors.
- 04.07 Identify and define operating characteristics and applications of field effect transistors.
- 04.08 Identify and define operating characteristics and applications of single-stage amplifiers.
- 04.09 Construct single-stage amplifiers.
- 04.10 Analyze and troubleshoot single-stage amplifiers.
- 04.11 Construct thyristor circuitry.
- 04.12 Analyze and troubleshoot thyristor circuitry.
- 04.13 Set up and operate a VOM for solid-state devices.
- 04.14 Set up and operate a DVM for sold-state devices.
- 04.15 Set up and operate power supplies for sold-state devices.
- 04.16 Set up and operate oscilloscopes for solid-state devices.
- 04.17 Set up and operate function generators for solid-state devices.
- 04.18 Set up and operate capacitor and inductor analyzers for sold-state devices.
- 04.19 Set up and operate curve tracers.
- 04.20 Set up and operate transistor testers.

05.0 DEMONSTRATE PROFICIENCY IN ANALOG CIRCUITS--The student will be able to:

- 05.01 Identify and define operational characteristics and applications of multistage amplifiers.
- 05.02 Construct multistage amplifiers.
- 05.03 Analyze and troubleshoot multistage amplifiers.
- 05.04 Identify and define operating characteristics and applications of liner integrated circuits.
- 05.05 Identify and define operating characteristics and applications of basic power supplies and filters.

05.06 Construct basic power supplies and filters.
05.07 Troubleshoot basic power supplies and filters.
05.08 Identify and define operating characteristics and applications of differential and operational amplifiers.
05.09 Construct differential and operational amplifier circuits.
05.10 Analyze and troubleshoot differential and operational amplifier circuits.
05.11 Identify and define operating characteristics of audio power amplifiers.
05.12 Construct audio power amplifiers.
05.13 Analyze and troubleshoot audio power amplifiers.
05.14 Identify and define operating characteristics and applications of power supply regulator circuits.
05.15 Construct power supply regulator circuits.
05.16 Analyze and troubleshoot power supply regulator circuits.
05.17 Identify and define operating characteristics and applications of active filters.
05.18 Construct active filter circuits.
05.19 Analyze and troubleshoot active filter circuits.
05.20 Identify and define operating characteristics and applications of sinusoidal and nonsinusoidal oscillator circuits.
05.21 Construct oscillator circuits.
05.22 Analyze and troubleshoot oscillator circuits.
05.23 Identify and define operating characteristics and applications of motor phase-shift control circuits (single-phase and multiphase).
05.24 Identify and define operating characteristics and applications of cathode ray tubes.
05.25 Identify and define operating characteristics and applications of optoelectronic devices.
05.26 Set up and operate measuring instruments for analog circuits.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8730140
Course Title: Consumer Electronic Repair 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in digital circuits.

06.0 DEMONSTRATE PROFICIENCY IN DIGITAL CIRCUITS--The student will be able to:

- 06.01 Define and apply numbering systems to codes and arithmetic operations.
- 06.02 Analyze and minimize logic circuits using Boolean operations.
- 06.03 Set up and operate logic probes for digital circuits.
- 06.04 Set up and operate power supplies for digital circuits and solve power distribution and noise problems.
- 06.05 Set up and operate pulsers for digital circuits.
- 06.06 Set up and operate oscilloscopes for digital circuits.
- 06.07 Set up and operate logic analyzers for digital circuits.
- 06.08 Set up and operate pulse generators for digital, circuits.
- 06.09 Identify types of logic gates and their truth tables.
- 06.10 Construct combinational logic circuits using integrated circuits.
- 06.11 Troubleshoot logic circuits.
- 06.12 Analyze types of flip-flops and their truth tables.
- 06.13 Construct flip-flops using integrated circuits.
- 06.14 Troubleshoot flip-flops.
- 06.15 Identify, define and measure characteristics of integrated circuit (IC) logic families.
- 06.16 Identify types of registers and counters.
- 06.17 Construct registers and counters using flip-flops and logic gates.
- 06.18 Troubleshoot registers and counters.
- 06.19 Analyze clock and timing circuits.
- 06.20 Construct clock and timing circuits.
- 06.21 Troubleshoot clock and timing circuits.
- 06.22 Identify types of arithmetic-logic circuits.
- 06.23 Construct arithmetic-logic circuits.
- 06.24 Troubleshoot arithmetic-logic circuits.
- 06.25 Identify types of encoding and decoding devices.
- 06.26 Construct encoders and decoders.
- 06.27 Troubleshoot encoders and decoders.
- 06.28 Identify types of multiplexer and demultiplexer circuits.
- 06.29 Construct multiplexer and demultiplexer circuits using integrated circuits.
- 06.30 Troubleshoot multiplexer and demultiplexer circuits.
- 06.31 Identify types of memory circuits.

06.32 Relate the uses of digital-to-analog and analog-to-digital conversions.
06.33 Construct digital-to-analog and analog-to-digital circuits.
06.34 Troubleshoot digital-to-analog- and analog-to-digital circuits.
06.35 Identify types of digital displays.
06.36 Construct digital display circuits.
06.37 Troubleshoot digital display circuits.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8730150
Course Title: Consumer Electronic Repair 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in microprocessors and technical recording and reporting.

07.0 DEMONSTRATE PROFICIENCY IN MICROPROCESSOR SYSTEMS--The student will be able to:

07.01 Identify central processing unit (CPU) building blocks and their uses (architecture).
07.02 Analyze bus concepts.
07.03 Analyze various memory schemes.
07.04 Use memory devices in circuits.
07.05 Troubleshoot memory device circuits.
07.06 Setup and operate oscilloscopes of microprocessor systems.
07.07 Setup and operate logic-date analyzers for troubleshooting microprocessor systems.
07.08 Identify types of input and output devices and peripherals.
07.09 Interface input and output ports to peripherals.
07.10 Analyze and troubleshoot input and output ports.
07.11 Execute computer instruction sets.

08.0 DEMONSTRATE PROFICIENCY IN TECHNICAL RECORDING AND REPORTING--The student will be able to:

08.01 Draw and interpret electronic schematics.
08.02 Record data and design curves and graphs.
08.03 Write reports and make oral presentations.
08.04 Maintain test logs.
08.05 Make equipment failure reports.
08.06 Specify and requisition simple electronic components.
08.07 Compose technical letters and memoranda.
08.08 Write formal reports of laboratory experiences.
08.09 Draft preventive maintenance and calibration procedures.

11.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

11.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
11.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
11.03 Read and follow written and oral instructions.
11.04 Answer and ask questions coherently and concisely.

11.05 Read critically by recognizing assumptions and implications and by evaluating ideas.

11.06 Demonstrate appropriate telephone/communication skills.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8730160
Course Title: Consumer Electronic Repair 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in repairing radio and television receiving systems, employability skills and entrepreneurship.

09.0 DEMONSTRATE PROFICIENCY IN SURFACE MOUNTED DEVICES (SMD)--The student will be able to:

- 09.01 Identify types of surface mounted devices (SMD's) for DC, AC and solid-state circuits.
- 09.02 Identify defective SMD's using appropriate troubleshooting techniques.
- 09.03 Remove and replace SMD's using specialized soldering and desoldering techniques.
- 09.04 Handle static sensitive devices.

10.0 DEMONSTRATE PROFICIENCY IN RADIO AND TELEVISION RECEIVING SYSTEMS--The student will be able to:

- 10.01 Read and interpret radio and television receiving system block and circuit diagrams.
- 10.02 Determine the operational status of radio and television receiving systems.
- 10.03 Troubleshoot radio and television receiving systems.
- 10.04 Remove and replace radio and television receiving system components.
- 10.05 Perform operating systems check and make minor adjustments to radio and television receiving systems.
- 10.06 Set up and operate video analyzers.
- 10.07 Set up and operate National Television Signal Codes (NTSC) generators.
- 10.08 Set up and operate cathode ray tube (CRT) analyzers.
- 10.09 Set up and operate stereo generators.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 14.01 Conduct a job search.
- 14.02 Secure information about a job.
- 14.03 Identify documents that may be required when applying for a job.
- 14.04 Complete a job application form correctly.
- 14.05 Demonstrate competence in job interview techniques.
- 14.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.

14.07 Identify acceptable work habits.
14.08 Demonstrate knowledge of how to make appropriate job changes.
14.09 Demonstrate acceptable employee health habits.
14.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

15.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

15.01 Define entrepreneurship.
15.02 Describe the importance of entrepreneurship to the American economy.
15.03 List the advantages and disadvantages of business ownership.
15.04 Identify the risks involved in ownership of a business.
15.05 Identify the necessary personal characteristics of a successful entrepreneur.
15.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Culinary Management
Occupational Area:	Industrial Education
	PSV
CIP Number	0620.040100
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment in commercial and institutional management positions leading to: Executive Chef, Stewart, Food and Beverage Director, Restaurant Manager, or Caterer. This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content will include, but not be limited to, the following: Supervision and personnel management, Culinary Organization, Culinary Terminology and Communications, Human Relations, Personnel Training, Sanitation and Safety, Food and Beverage Purchasing, Cost Control, Menu Design, Merchandising, Dining Room Management, Human Nutrition, Food Production, Regional and International Cuisines, Classical Cuisine, Basic Baking, Advanced Pastry and Deserts, Garde Manger, and Beverage Management.

The course content should also include training in communications, leadership, human relations, employability skills and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Culinary industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Laboratory activities and volume production are integral parts of this program. The student will gain the competence required to manage each station under the pressure of commercial business. These activities equip students to produce rapidly, utilizing the hand tools, equipment, food materials, practices, processes, and management techniques found in the industry.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for part of this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The standard credit hour length for this program is 64 according to SBR 6A-14.030.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Identify the organization and functions of the Culinary Industry.
02.0 Demonstrate acceptable professional and personal sanitation practices.
03.0 Demonstrate safe working practices.
04.0 Demonstrate equipment operation skills.
05.0 Demonstrate the application of mathematics as it applies to the production of products and the business of the Culinary Industry.
06.0 Demonstrate effective purchasing and cost control.
07.0 Prepare, direct and manage the production of salads.
08.0 Prepare, direct and manage the production of beverages.
09.0 Prepare, direct and manage the production of sandwiches.
10.0 Prepare, direct and manage the production fruits and vegetables.
11.0 Prepare, direct and manage the production of meats, poultry, and seafood.
12.0 Prepare, direct and manage the production of stocks, soups, and sauces/gravies.
13.0 Prepare, direct and manage the production of foods utilizing dairy products.
14.0 Prepare, direct and manage the production of foods utilizing egg products.
15.0 Prepare, direct and manage the production of foods utilizing farinaceous (starchy) products.
16.0 Prepare, direct and manage the production of pastries and advanced desserts.
17.0 Prepare, direct and manage the production of basic quick breads and yeast dough.
18.0 Demonstrate an understanding of the composition of foods, and the processes used for preparation.
19.0 Demonstrate skill in applying principles of nutrition.

20.0 Demonstrate skill in utilizing wines and spirits in production and in dining service.

21.0 Demonstrate proficiency in menu preparation.

22.0 Demonstrate proficiency in the management of dining room operations.

23.0 Demonstrate a proficiency in the management of customer relations.

24.0 Demonstrate appropriate communication skills.

25.0 Demonstrate employability skills.

26.0 Demonstrate an understanding of entrepreneurship.

27.0 Demonstrate the human relations skills necessary for success in marketing culinary management occupations.

28.0 Apply sales promotion techniques and procedures to the management of food services.

29.0 Demonstrate a knowledge of basic economic principles.

30.0 Understand the importance of management.

31.0 Deal with legal issues.

32.0 Comply with governmental regulations.

33.0 Manage human resources.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Culinary Management
Secondary Number:
Postsecondary Number: 0620.040100

01.0 IDENTIFY THE ORGANIZATION AND FUNCTIONS OF THE CULINARY INDUSTRY--The student will be able to:

- 01.01 Identify the Culinary Brigade.
- 01.02 Identify classic repertoire.
- 01.03 Identify modern kitchen organization.
- 01.04 Identify station and job descriptions.
- 01.05 Identify culinary terms.
- 01.06 Identify career progression in culinary arts.
- 01.07 Trace growth and development of food and beverage industry.
- 01.08 Discuss history and composition of foods and beverages.
- 01.09 Discuss trends in food and beverage industry.

02.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--The student will be able to:

- 02.01 Chemical/Cleaning Agents.
  - 02.01.01 Identify chemicals/cleaning agents and describe and practice proper usage.
  - 02.01.02 Identify and practice proper storage procedures for chemicals/cleaning agents.
  - 02.01.03 Identify and practice personnel handling precautions for caustics and acids.
  - 02.01.04 Identify dangers of food contamination by chemicals/cleaning agents and identify and practice precautions against food contamination by chemicals/cleaning agents.
- 02.02 Food Borne Illness.
  - 02.02.01 Identify food borne illness and possible/probable causes.
  - 02.02.02 Identify and practice preventative measures to preclude the occurrence of food borne illness.
- 02.03 Personal Sanitation.
  - 02.03.01 Recognize and practice personal hygiene standards consistent with aesthetic and sanitation requirements of food service operations.
- 02.04 Receiving/Dry Stores Area.
  - 02.04.01 Recognize and maintain a clean and sanitary receiving/dry stores area.
  - 02.04.02 Clean and sanitize floors and walls.
  - 02.04.03 Recognize and report indications of food spoilage.
  - 02.04.04 Recognize and report indications of insect or rodent infestation.
- 02.05 Food Preparation Areas.
  - 02.05.01 Recognize and maintain clean and sanitary food preparation surfaces.

02.05.02 Clean and sanitize floors and walls.
02.05.03 Recognize and report indications of insect or rodent infestation.

02.06 Range Hoods.
02.06.01 De-grease and clean range hoods.
02.06.02 Remove, clean, and replace filters.

02.07 Reefers, Chill Boxes, and Freezers (Refrigerated Spaces).
02.07.01 Identify safe/correct operating temperatures and limits in accordance with state and county codes and local practices.
02.07.02 Recognize and practice sanitary/safe food handling practices in refrigerated spaces.
02.07.03 Recognize and maintain clean and sanitary refrigerated spaces.
02.07.04 Recognize and report indications of food spoilage.

02.08 Food holding/Serving lines.
02.08.01 Identify safe/correct operating temperatures and limits in accordance with state and county codes and local practices.
02.08.02 Recognize and practice sanitary/safe food handling practices in food holding areas and serving lines.
02.08.03 Recognize and maintain clean and sanitary food holding areas and serving lines.
02.08.04 Recognize and report indications of food spoilage.

02.09 Dishware/Tableware.
02.09.01 Properly prepare dish washing area for use.
02.09.02 Properly prepare, clean, rinse, sanitize, and dry dishware and tableware items.
02.09.03 Properly clean, sanitize, and secure dish washing area.

02.10 Pots, Pans, and Cook Utensils.
02.10.01 Properly prepare deep-sink area for use.
02.10.02 Properly prepare, clean, rinse, sanitize and dry pots, pans and cooking utensils.
02.10.03 Properly clean, sanitize, and secure deep-sink area.

02.11 Guest/Customer Areas.
02.11.01 Properly clean and sanitize counter areas.
02.11.02 Properly clean and sanitize dining areas.
02.11.03 Properly clean and sanitize restrooms.

03.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

03.01 Safety Hazards.
03.01.01 Identify physical safety rules.
03.01.02 Identify physical safety hazards.
03.01.03 Recognize and correct or report physical safety hazards.
03.01.04 Identify electrical safety rules.
03.01.05 Identify electrical safety hazards.
03.01.06 Recognize and correct or report electrical safety hazards.
03.01.07 Identify fire safety rules.
03.01.08 Identify fire safety hazards.
03.01.09 Recognize and correct or report fire safety hazards.

03.02 First Aid.

03.02.01 Identify First Aid requirements for a commercial food service operation.

03.02.02 Prepare subject and perform Heimlich maneuver.

04.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

04.01 Hand Tools.

04.01.01 Identify special precautions to be used when working with hand tools.

04.01.02 Select and use hand tools in a safe and efficient manner.

04.02 Beverage Equipment.

04.02.01 Identify special precautions to be used when working with beverage equipment.

04.02.02 Correctly assemble and disassemble beverage equipment.

04.02.03 Operate beverage equipment in a safe and efficient manner.

04.03 Pressure Cookers and Steam Equipment.

04.03.01 Identify special precautions to be used when working with steam under pressure.

04.03.02 Correctly assemble and disassemble equipment. Inspect all parts, gaskets and seals and report any discrepancy.

04.03.03 Operate pressure cookers and steam equipment in a safe and efficient manner.

04.04 Grinders and Tenderizers.

04.04.01 Identify special precautions to be used when working with grinders and tenderizers.

04.04.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

04.04.03 Operate grinders and tenderizers in a safe and efficient manner.

04.05 Knives and Cutting Tools.

04.05.01 Identify special precautions to be used when working with knives and cutting tools.

04.05.02 Sharpen correctly knives and cutting tools. Inspect handles and guards and report any discrepancy.

04.05.03 Use knives and cutting tools in a safe and efficient manner.

04.06 Ovens, Ranges, Griddles, Fryers, Broilers, and Toasters.

04.06.01 Identify special precautions to be used when working with ovens, ranges, griddles, fryers, broilers and toasters.

04.06.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

04.06.03 Operate ovens, ranges, griddles, fryers, broilers and toasters in a safe and efficient manner.

04.07 Proofers.

04.07.01 Identify special precautions to be used when working with proofers.

04.07.02 Correctly assemble and disassemble equipment. Inspect all parts, gaskets and seals and report any discrepancy.

04.07.03 Operate proofers in a safe and efficient manner.

04.08 Mixers and Blenders.

04.08.01 Identify special precautions to be used when working with mixers and blenders.

04.08.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

04.08.03 Operate mixers and blenders in a safe and efficient manner.

04.08.04 Perform the above competencies for all accessories or attachments used with the equipment.

04.09 Slicing Machines.

04.09.01 Identify special precautions to be sued when working with slicing machines.

04.09.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy. (Note: Special attention should be given to the guards on this machine.)

04.09.03 Operate slicing machines in a safe and efficient manner.

04.10 Food Warmers.

04.10.01 Identify special precautions to be used when working with food warmers.

04.10.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.

04.10.03 Operate food warmers in a safe and efficient manner.

05.0 DEMONSTRATE THE APPLICATION OF MATHEMATICS AS IT APPLIES TO THE PRODUCTION OF PRODUCTS AND THE BUSINESS OF THE CULINARY INDUSTRY--The student will be able to:

05.01 Demonstrate proficiency in basic math skills.

05.01.01 Demonstrate proficiency in the addition of whole numbers, fractions, and decimals.

05.01.02 Demonstrate proficiency in the subtraction of whole numbers, fractions, and decimals.

05.01.03 Demonstrate proficiency in the multiplication of whole numbers, fractions, and decimals.

05.01.04 Demonstrate proficiency in the division of whole numbers, fractions, and decimals.

05.02 Demonstrate knowledge of measures and conversions.

05.02.01 Demonstrate knowledge of weight units and their conversion.

05.02.02 Demonstrate knowledge of volume units and their conversion.

05.03 Demonstrate knowledge of recipe conversions.

05.03.01 Convert recipes for greater or lesser number of servings.

05.04 Demonstrate effective cost estimation.

05.04.01 Estimate material cost per serving.

05.04.02 Estimate preparation cost (less materials).

05.04.03 Cost out menu given profit margin.

05.05 Identify the break-even point for merchandising.
05.06 Perform mathematical operations unique to culinary management.

06.0 DEMONSTRATE EFFECTIVE PURCHASING AND COST CONTROL--The student will be able to:

06.01 Inventory Control.
- 06.01.01 Receive stores/supplies, count accurately and compare quantity received against invoice. Record received amount and process invoice in accordance with local procedures.
- 06.01.02 Store received stores/supplies in proper location. Rotate stores/materials in accordance with local procedures.
- 06.01.03 Conduct and accurately record an inventory of stores/supplies. Process inventory in accordance with local procedures.
- 06.01.04 Make break-outs and distribute stores/supplies. Utilize local procedures to maintain perpetual inventory.

06.02 Weights and Measures.
- 06.02.01 Identify standard volume, liquid and weight as they apply to commercial food operations.
- 06.02.02 Convert accurately between standard units of measure as applicable to commercial food operations.
- 06.02.03 Convert recipes for both a greater and lesser number of portions.

06.03 Portion Control.
- 06.03.01 Identify principles of portion control and calculate cost per serving (Note: Cost of incorrect portion size, waste, and spoilage may be addressed here.)
- 06.03.02 Identify and apply portion control methods.

06.04 Purchasing Techniques.
- 06.04.01 Write purchasing specifications.
- 06.04.02 Identify purchasing methods such as: direct buying; contract buying and bidding.

07.0 PREPARE, DIRECT AND MANAGE THE PRODUCTION OF SALADS--The student will be able to:

07.01 Identify and select materials for salad preparation.
07.02 Prepare salads.
07.03 Hold salads for service.
07.04 Garnish and present salads.
07.05 Store reusable portions.
07.06 Prepare salad dressings, cold sauces, and derivatives.
07.07 Utilize principles of inventory control, cost control, portion control, management, human relations, and training skills.

08.0 PREPARE, DIRECT AND MANAGE THE PRODUCTION OF BEVERAGES--The student will be able to:

08.01 Identify and select materials for beverage preparation.
08.02 Prepare hot and cold beverages.

08.03 Hold beverages for serving.
08.04 Garnish and present beverages.
08.05 Store reusable portions.
08.06 Utilize principles of inventory control, cost control, portion control, management, human relations, and training skills.

09.0 PREPARE, DIRECT AND MANAGE THE PRODUCTION OF SANDWICHES--The student will be able to:

09.01 Identify and select materials for sandwich preparation.
09.02 Prepare hot and cold sandwiches.
09.03 Hold sandwiches for serving.
09.04 Garnish and present sandwiches.
09.05 Store reusable portions.
09.06 Utilize principles of inventory control, cost control, portion control, management, human relations, and training skills.

10.0 PREPARE, DIRECT AND MANAGE THE PRODUCTION OF FRUITS AND VEGETABLES--The student will be able to:

10.01 Identify and select fruits and vegetables.
10.02 Prepare fruits and vegetables.
10.03 Hold fruits and vegetables for serving.
10.04 Garnish and present fruits and vegetables.
10.05 Store reusable portions.
10.06 Utilize principles of inventory control, cost control, portion control, management, human relations, and training skills.

11.0 PREPARE, DIRECT AND MANAGE THE PRODUCTION OF MEATS, POULTRY AND SEAFOOD--The student will be able to:

11.01 Identify and select meats.
- 11.01.01 Identify meat characteristics, proper cooking and done temperatures, traditional side dishes and condiments, possible parasites, and potential micro-organism growth.
- 11.01.02 Prepare meats with given recipes.
- 11.01.03 Hold meats for serving.
- 11.01.04 Garnish and present meats.
- 11.01.05 Store reusable portions.
- 11.01.06 Utilize principles of inventory control, cost control, portion control, management, human relations, and training skills.

11.02 Identify and select poultry.
- 11.02.01 Identify poultry characteristics, proper cooking and done temperatures, traditional side dishes and condiments, possible parasites, and potential micro-organism growth.
- 11.02.02 Prepare poultry with given recipes.
- 11.02.03 Hold poultry for serving.
- 11.02.04 Garnish and present poultry.
- 11.02.05 Store reusable portions.

11.02.06 Utilize principles of inventory control, cost control, portion control, management, human relations, and training skills.

11.03 Identify and select seafood.

11.03.01 Identify seafood characteristics, proper cooking and done temperatures, traditional side dishes and condiments, possible parasites, and potential micro-organism growth.

11.03.02 Prepare seafood with given recipes.

11.03.03 Hold seafood for serving.

11.03.04 Garnish and present seafood.

11.03.05 Store reusable portions.

11.03.06 Utilize principles of inventory control, cost control, portion control, management, human relations, and training skills.

12.0 PREPARE, DIRECT AND MANAGE THE PRODUCTION OF STOCKS, SOUPS, AND SAUCES/GRAVIES--The student will be able to:

12.01 Stocks.

12.01.01 Identify and select ingredients.

12.01.02 Prepare basic stocks.

12.01.03 Store stock for future use.

12.01.04 Utilize principles of inventory control, cost control, portion control, management, human relations, and training skills.

12.02 Soups.

12.02.01 Identify and select ingredients.

12.02.02 Prepare soups.

12.02.03 Hold soups for service.

12.02.04 Garnish and present soups

12.02.05 Store leftover portions for future use.

12.02.06 Utilize principles of inventory control, cost control, portion control, management, human relations, and training skills.

12.03 Sauces and Gravies

12.03.01 Identify and select ingredients.

12.03.02 Prepare sauces and gravies.

12.03.03 Hold sauces and gravies for service.

12.03.04 Store left over sauces and gravies for future use.

12.03.07 Utilize principles of inventory control, cost control, portion control, management, human relations, and training skills.

13.0 PREPARE, DIRECT AND MANAGE THE PRODUCTION OF FOODS UTILIZING DAIRY PRODUCTS--The student will be able to:

13.01 Identify and select dairy products.

13.02 Prepare foods utilizing dairy products using given recipes.

13.03 Hold food containing dairy products for service.

13.04 Garnish and present foods containing dairy products.

13.05 Store reusable portions.

13.06 Utilize principles of inventory control, cost control, portion control, management, human relations, and training skills.

14.0 PREPARE, DIRECT AND MANAGE THE PRODUCTION OF FOODS UTILIZING EGG PRODUCTS--The student will be able to:

14.01 Identify and select egg products.
14.02 Prepare foods utilizing egg products using given recipes.
14.03 Hold food containing egg products for service.
14.04 Garnish and present foods containing egg products.
14.05 Store reusable portions.
14.06 Utilize principles of inventory control, cost control, portion control, management, human relations, and training skills.

15.0 PREPARE, DIRECT AND MANAGE THE PRODUCTION OF FOODS UTILIZING FARINACEOUS (STARCHY) PRODUCTS--The student will be able to:

15.01 Identify and select farinaceous products.
15.02 Prepare foods utilizing farinaceous products using given recipes.
15.03 Hold food containing farinaceous products for service.
15.04 Garnish and present foods containing farinaceous products.
15.05 Store reusable portions.
15.06 Utilize principles of inventory control, cost control, portion control, management, human relations, and training skills.

16.0 PREPARE, DIRECT AND MANAGE THE PRODUCTION OF PASTRIES AND ADVANCED DESSERTS--The student will be able to:

16.01 Identify and select ingredients.
16.02 Prepare basic products.
16.03 Hold products for service.
16.04 Garnish and present products.
16.05 Store reusable portions.
16.06 Utilize principles of inventory control, cost control, portion control, management, human relations, and training skills.

17.0 PREPARE, DIRECT AND MANAGE THE PRODUCTION OF BASIC QUICK BREADS AND YEAST DOUGH--The student will be able to:

17.01 Quick Breads.
- 17.01.01 Identify and select quick bread ingredients.
- 17.01.02 Prepare quick breads using given recipes.
- 17.01.03 Hold quick breads for service.
- 17.01.04 Present quick breads.
- 17.01.05 Store reusable portions.
- 17.01.06 Utilize principles of inventory control, cost control, portion control, management, human relations, and training skills.

17.02 Yeast dough.
- 17.02.01 Identify and select yeast dough ingredients.
- 17.02.02 Prepare yeast dough products using given recipes.
- 17.02.03 Hold yeast dough products for service.
- 17.02.04 Present yeast dough products.
- 17.02.05 Store reusable portions.

17.02.06 Utilize principles of inventory control, cost control, portion control, management, human relations, and training skills.

18.0 DEMONSTRATE AN UNDERSTANDING OF THE COMPOSITION OF FOODS, AND THE PROCESSES USED FOR PREPARATION--The student will be able to:

18.01 Identify the composition of foods.
- 18.01.01 Identify the composition of meats.
- 18.02.02 Identify the composition of fruits, vegetables, and starches.

18.02 Identify cooking methods and demonstrate a knowledge of:
- 18.02.01 Liquid retention.
- 18.02.02 Vitamin and mineral retention.
- 18.02.03 Retention of color and composition.

19.0 DEMONSTRATE SKILL IN APPLYING PRINCIPLES OF NUTRITION--The student will be able to:

19.01 Identify food groups.

19.02 Define dietary allowances of:
- 19.02.01 Proteins
- 19.02.02 Fats
- 19.02.03 Carbohydrates
- 19.02.04 Vitamins/minerals

19.03 Define exchange groups.

20.0 DEMONSTRATE SKILL IN UTILIZING WINES AND SPIRITS IN PRODUCTION AND IN DINING SERVICE--The student will be able to:

20.01 Demonstrate knowledge of history of wine and spirits.

20.02 Demonstrate an understanding and effectively use wine and spirit terms.

20.03 Properly present and serve wines and spirits.

20.04 Prepare and direct production of foods utilizing wines and spirits.

21.0 DEMONSTRATE PROFICIENCY IN MENU PREPARATION--The student will be able to:

21.01 Prepare menu considering:
- 21.01.01 Eating trends
- 21.01.02 Nutritional requirements
- 21.01.03 Cost
- 21.01.04 Limiting factors of facilities and/or personnel
- 21.01.05 Seasonal or traditional eating habits (holidays, ethnic, regional)
- 21.01.06 Seasonal foods
- 21.01.07 Apply basic techniques of merchandising food and beverage

22.0 DEMONSTRATE PROFICIENCY IN THE MANAGEMENT OF DINING ROOM OPERATIONS--The student will be able to:

22.01 Prepare and maintain dining room for service.
22.02 Greet and escort customers.
22.03 Customer Service.
- 22.03.01 Present menu/menus
- 22.03.02 Sell and merchandise menu items.
- 22.03.03 Take orders.
- 22.03.04 Serve food.
- 22.03.05 Calculate and present guest check.

22.04 Handling money.
- 22.04.01 Demonstrate responsible cash handling.
- 22.04.02 Demonstrate ability to calculate and county customers change.

22.05 Utilize the principles of management, human relations and training skills.

23.0 DEMONSTRATE A PROFICIENCY IN THE MANAGEMENT OF CUSTOMER RELATIONS--The student will be able to:

23.01 Resolve customer complaints in a positive professional manner.
23.02 Cope with stressful situations.
23.03 Accommodate the needs of customers (handicapped, infants, elderly.)
23.04 Maintain a positive friendly dining room attitude.
23.05 Display team work.
23.06 Present a neat and clean appearance that will promote a positive image of the establishment.
23.07 Utilize the principles of management and human relations.

24.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

24.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
24.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
24.03 Read and follow written and oral instructions.
24.04 Answer and ask questions coherently and concisely.
24.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
24.06 Demonstrate appropriate telephone/communication skills.
24.07 Demonstrate the components of the communication process.

25.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

25.01 Conduct a job search.
25.02 Secure information about a job.
25.03 Identify documents which may be required when applying for a job.
25.04 Complete a job application form correctly.
25.05 Demonstrate competence in job interview techniques.
25.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
25.07 Identify acceptable work habits.

25.08 Demonstrate a knowledge of how to make job changes appropriately.
25.09 Demonstrate acceptable employee health habits.
25.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

26.0 DEMONSTRATE THE ROLE OF THE MANAGER AND THE ENTREPRENEUR--The student will be able to:

26.01 Define entrepreneurship.
26.02 Describe the importance of entrepreneurship to the American economy.
26.03 List the advantages and disadvantages of business ownership.
26.04 Identify the risks involved in ownership of a business.
26.05 Identify the necessary personal characteristics of a successful entrepreneur.
26.06 Identify the business skills needed to operate a small business efficiently and effectively.
26.07 Consider the personal qualifications and abilities needed to manage and/or own a business.
26.08 Evaluate your own potential for decision making, problem solving, and creativity.
26.09 Determine your potential for management, planning, operations, personnel, and public relations.

27.0 DEMONSTRATE THE HUMAN RELATIONS SKILLS NECESSARY FOR SUCCESS IN MARKETING CULINARY MANAGEMENT OCCUPATIONS--The student will be able to:

27.01 Exhibit acceptable grooming habits.
27.02 Exhibit punctuality, initiative, courtesy, loyalty, and honesty.
27.03 Exhibit the ability to get along with others.
27.04 Build a framework of steps necessary to successfully plan one's professional future.

28.0 APPLY SALES PROMOTION TECHNIQUES AND PROCEDURES TO THE MANAGEMENT OF FOOD SERVICES--The student will be able to:

28.01 Explain the benefits of publicity and public relations.
28.02 Use the telephone as effective sales promotion instrument.
28.03 Implement the services of advertising agencies.
28.04 Utilize various advertising media effectively.

29.0 DEMONSTRATE A KNOWLEDGE OF BASIC ECONOMIC PRINCIPLES--The student will be able to:

29.01 Identify basic economic concepts.
29.02 Apply basic economic principles.

30.0 UNDERSTAND THE IMPORTANCE OF MANAGEMENT--The student will be able to:

30.01 Identify basic management concepts.
30.02 Discuss overall management strategies.
30.03 Relate management techniques to the culinary industry.

31.0 DEAL WITH LEGAL ISSUES--The student will be able to:

31.01 Discuss legal rights of customers.
31.02 Discuss applicable wage and hour laws.
31.03 Discuss laws affecting hiring practices.
31.04 Discuss public health and safety laws.
31.05 Discuss license and beverage regulations.
31.06 Discuss warranties and product liabilities.
31.07 Discuss tax laws.
31.08 Discuss banquet contracts.

32.0 COMPLY WITH GOVERNMENTAL REGULATIONS--The student will be able to:

32.01 Identify areas of government regulation that should be considered by the food service industry.
32.02 Compile a list of appropriate governmental agencies concerned with regulations, licenses, and permits.

33.0 MANAGE HUMAN RESOURCES--The student will be able to:

33.01 Identify the steps involved in hiring employees.
33.02 Describe the procedures for developing a training program.
33.03 Describe various techniques that may be used to supervise and motivate employees.
33.04 Describe various methods for communicating with employees.
33.05 Discuss various alternatives for evaluating employee performance
33.06 Identify the steps in developing a comprehensive employee compensation package.
33.07 Demonstrate the ability to create personnel schedules.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Diesel Engine Mechanics
Occupational Area:	Industrial Education
	Secondary
Program Numbers	**8742000**
CIP Number	0647.060500
Grade Level	9-12, 30, 31
Length	6 credits
Certification	DESEL MECH @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as bus and truck diesel engine mechanics (85311641) and diesel mechanics helpers (625.684-010). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content will include the following: maintaining and repairing diesel engines and electrical systems; reconditioning diesel fuel injection systems; overhauling diesel engines; and performing diesel engine preventive maintenance.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

Listed below are the courses that comprise this program when offered at the secondary level.

8742010 - Diesel Engine Mechanics 1
8742020 - Diesel Engine Mechanics 2
8742030 - Diesel Engine Mechanics 3
8742040 - Diesel Engine Mechanics 4
8742050 - Diesel Engine Mechanics 5
8742060 - Diesel Engine Mechanics 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Diesel Engine Mechanics industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such

organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

The outcomes and student performance standards which the handicapped student must master must be specified in each student's Individual Education Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with subsequent IEPs The job title for which the student is being trained must be designated in the IEP.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in performing diesel trade skills.
02.0 Demonstrate proficiency in applying electrical principles.
03.0 Demonstrate proficiency in applying electronic principles.
04.0 Demonstrate proficiency in maintaining and repairing diesel engines.
05.0 Demonstrate proficiency in maintaining and repairing electrical systems.
06.0 Demonstrate proficiency in reconditioning diesel fuel injection systems.
07.0 Demonstrate proficiency in reconditioning diesel engine components.
08.0 Demonstrate proficiency in overhauling diesel engines (two-stroke and four-stroke cycle engines).
09.0 Demonstrate proficiency in performing diesel engine preventive maintenance (PM).
10.0 Demonstrate appropriate communication skills.
11.0 Demonstrate appropriate math skills.
12.0 Demonstrate appropriate understanding of basic science.
13.0 Demonstrate employability skills.
14.0 Demonstrate an understanding of entrepreneurship.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Diesel Engine Mechanics
Secondary Number: 8742000
Postsecondary Number:

01.0 DEMONSTRATE PROFICIENCY IN PERFORMING DIESEL TRADE SKILLS--The student will be able to:

- 01.01 Follow safety practices.
- 01.02 Apply basic math skills.
- 01.03 Apply intermediate math skills.
- 01.04 Recognize, identify and make metric conversions.
- 01.05 Perform basic welding skills.
- 01.06 Use hand tools.
- 01.07 Use power tools.
- 01.08 Use measuring and precision tools.
- 01.09 Identify types of bearings and seals.
- 01.10 Identify power train components and functions.
- 01.11 Identify threaded fasteners by size, type, thread series, thread classes, material hardness and compatibility.
- 01.12 Read and use parts manuals.
- 01.13 Read, interpret and apply service manuals.

02.0 DEMONSTRATE PROFICIENCY IN APPLYING ELECTRICAL PRINCIPLES--The student will be able to:

- 02.01 Identify the nature of electricity.
- 02.02 Analyze electrical circuits.
- 02.03 Define Ohm's and Kirchoff's laws.
- 02.04 Identify magnetism and electromagnetic induction.
- 02.05 Identify applications of alternating current.
- 02.06 Identify principles of direct-current (DC) motors and generators.
- 02.07 Identify principles of alternating-current (AC) motors.
- 02.08 Locate and match electrical units by their symbols on a wiring diagram.
- 02.09 Setup and use voltmeters, ammeters and ohmmeters.

03.0 DEMONSTRATE PROFICIENCY IN APPLYING ELECTRONIC PRINCIPLES--The student will be able to:

- 03.01 Identify principles of diodes and rectifiers.
- 03.02 Identify principles of voltage regulation and power supply circuits.
- 03.03 Identify principles of transistors.
- 03.04 Identify principles of the silicon controlled rectifier (SCR).
- 03.05 Identify components of electronic systems and their functions.

04.0 DEMONSTRATE PROFICIENCY IN MAINTAINING AND REPAIRING DIESEL ENGINES--The student will be able to:

04.01 Identify diesel engine operating principles (two- and four-stroke cycle engines).
04.02 Identify components of two- and four-stroke cycle engines.
04.03 Troubleshoot and repair cooling systems.
04.04 Troubleshoot and repair lubrication systems.
04.05 Troubleshoot and repair induction and exhaust systems.

05.0 DEMONSTRATE PROFICIENCY IN MAINTAINING AND REPAIRING ELECTRICAL SYSTEMS--The student will be able to:

05.01 Test and service batteries.
05.02 Test and repair starting systems.
05.03 Test and repair DC charging systems.
05.04 Test and repair AC charging systems.
05.05 Test and repair ignition systems.
05.06 Test and repair lighting and accessories systems.
05.07 Test and service instruments and gauges.

06.0 DEMONSTRATE PROFICIENCY IN RECONDITIONING DIESEL FUEL INJECTION SYSTEMS--The student will be able to:

06.01 Identify fuel injection systems principles and components.
06.02 Troubleshoot fuel injection systems and components.
06.03 Remove, replace and adjust fuel injection systems and components.
06.04 Identify governor types and operating principles.
06.05 Troubleshoot governors.
06.06 Remove, repair or replace and adjust governors.

07.0 DEMONSTRATE PROFICIENCY IN RECONDITIONING DIESEL ENGINE COMPONENTS--The student will be able to:

07.01 Explain the basic principles of the operation of the two- and four-stroke cycle diesel engine.
07.02 Identify engine assemblies and systems.
07.03 Diagnose valve and head problems by use of the visual inspection method.
07.04 Diagnose valve and head problems by use of the compression tester method or cylinder air pressure method.
07.05 Diagnose valve and head problems by use of the stethoscope method.
07.06 Disassemble engines.
07.07 Clean and inspect heads for cracks, warpage and injector sleeves.
07.08 Inspect valves for warpage, burns, cracks, stem wear, tip wear and valve seat.
07.09 Grind valve seats and reface valves.
07.10 Check and inspect springs for free height, distortion and installed height.
07.11 Adjust valve lash.
07.12 Remove and inspect camshaft bearings and lifters.
07.13 Time valve drive assemblies.
07.14 Remove pistons from rod assemblies.

07.15 Measure out-of-round and cylinder taper with a dial bore gauge or micrometer.
07.16 Check piston pins and boss for wear.
07.17 Measure piston ring lands width, out-of-round and taper.
07.18 Measure the piston ring gap in a cylinder bore.
07.19 Install and fit piston pins.
07.20 Check rod and piston assembly alignment.
07.21 Remove and replace rod bearings.
07.22 Hone and clean cylinders.
07.23 Install rings on pistons.
07.24 Measure and check crankshafts with a micrometer.
07.25 Check the bearing bore with a telescoping gauge.
07.26 Reassemble engines using a plastic gauge.
07.27 Install oil seals.
07.28 Check for end play.

08.0 DEMONSTRATE PROFICIENCY IN OVERHAULING DIESEL ENGINES (TWO-STROKE AND FOUR-STROKE CYCLE ENGINES)--The student will be able to:

08.01 Troubleshoot and diagnose engine problems.
08.02 Remove and install electrical equipment.
08.03 Recondition turbochargers, blowers and superchargers.
08.04 Recondition cooling systems.
08.05 Recondition intake and exhaust manifolds.
08.06 Recondition fans, vibrator dampers and front pulleys.
08.07 Recondition air compressors.
08.08 Recondition flywheels.
08.09 Recondition flywheel housings.
08.10 Recondition lubrication systems.
08.11 Recondition front covers.
08.12 Remove and install fuel systems.
08.13 Recondition cylinder heads.
08.14 Recondition cylinder sleeves and pistons.
08.15 Recondition camshafts and accessory drives.
08.16 Recondition crankshafts.
08.17 Recondition cylinder blocks.
08.18 Perform dynamometer tests.

09.0 DEMONSTRATE PROFICIENCY IN PERFORMING DIESEL ENGINE PREVENTIVE MAINTENANCE (PM)--The student will be able to:

09.01 Perform PM inspection "A"
09.02 Perform PM inspection "B"
09.03 Perform PM inspection "C"

10.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

10.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
10.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
10.03 Read and follow written and oral instructions.

10.04 Answer and ask questions coherently and concisely.
10.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
10.06 Demonstrate appropriate telephone/communication skills.

11.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

11.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
11.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
11.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
11.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
11.05 Demonstrate an understanding of federal, state and local taxes and their computation.

12.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

12.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
12.02 Draw conclusions or make inferences from data.
12.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
12.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

13.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

13.01 Conduct a job search.
13.02 Secure information about a job.
13.03 Identify documents that may be required when applying for a job.
13.04 Complete a job application form correctly.
13.05 Demonstrate competence in job interview techniques.
13.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
13.07 Identify acceptable work habits.
13.08 Demonstrate knowledge of how to make appropriate job changes.
13.09 Demonstrate acceptable employee health habits.
13.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

14.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

14.01 Define entrepreneurship.
14.02 Describe the importance of entrepreneurship to the American economy.
14.03 List the advantages and disadvantages of business ownership.
14.04 Identify the risks involved in ownership of a business.

14.05 Identify the necessary personal characteristics of a successful entrepreneur.

14.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8742010
Course Title: Diesel Engine Mechanics 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for performing diesel trade skills and to enable the student to gain employability skills.

01.0 DEMONSTRATE PROFICIENCY IN PERFORMING DIESEL TRADE SKILLS--The student will be able to:

- 01.01 Follow safety practices.
- 01.02 Apply basic math skills.
- 01.03 Apply intermediate math skills.
- 01.04 Recognize, identify and make metric conversions.
- 01.05 Perform basic welding skills.
- 01.06 Use hand tools.
- 01.07 Use power tools.
- 01.08 Use measuring and precision tools.
- 01.09 Identify types of bearings and seals.
- 01.10 Identify power train components and functions.
- 01.11 Identify threaded fasteners by size, type, thread series, thread classes, material hardness and compatibility.
- 01.12 Read and use parts manuals.
- 01.13 Read, interpret and apply service manuals.

13.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 13.01 Conduct a job search.
- 13.02 Secure information about a job.
- 13.03 Identify documents that may be required when applying for a job.
- 13.04 Complete a job application form correctly.
- 13.05 Demonstrate competence in job interview techniques.
- 13.06 Identify for demonstrate appropriate responses to criticism from employer, supervisor or other persons.
- 13.07 Identify acceptable work habits.
- 13.08 Demonstrate knowledge of how to make appropriate job changes.
- 13.09 Demonstrate acceptable employee health habits.
- 13.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8742020
Course Title: Diesel Engine Mechanics 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for applying electrical and electronic principles.

02.0 DEMONSTRATE PROFICIENCY IN APPLYING ELECTRICAL PRINCIPLES--The student will be able to:

- 02.01 Identify the nature of electricity.
- 02.02 Analyze electrical circuits.
- 02.03 Define Ohm's and Kirchoff's laws.
- 02.04 Identify magnetism and electromagnetic induction.
- 02.05 Identify applications of alternating current.
- 02.06 Identify principles of direct-current (DC) motors and generators.
- 02.07 Identify principles of alternating-current (AC) motors.
- 02.08 Locate and match electrical units by their symbols on a wiring diagram.
- 02.09 Setup and use voltmeters, ammeters and ohmmeters.

03.0 DEMONSTRATE PROFICIENCY IN APPLYING ELECTRONIC PRINCIPLES--The student will be able to:

- 03.01 Identify principles of diodes and rectifiers.
- 03.02 Identify principles of voltage regulation and power supply circuits.
- 03.03 Identify principles of transistors.
- 03.04 Identify principles of the silicon controlled rectifier (SCR).
- 03.05 Identify components of electronic systems and their functions.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8742030
Course Title: Diesel Engine Mechanics 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for the maintenance and repair of diesel engines and electrical systems.

04.0 DEMONSTRATE PROFICIENCY IN MAINTAINING AND REPAIRING DIESEL ENGINES--The student will be able to:

- 04.01 Identify diesel engine operating principles (two- and four-stroke cycle engines).
- 04.02 Identify components of two- and four-stroke cycle engines.
- 04.03 Troubleshoot and repair cooling systems.
- 04.04 Troubleshoot and repair lubrication systems.
- 04.05 Troubleshoot and repair induction and exhaust systems.

05.0 DEMONSTRATE PROFICIENCY IN MAINTAINING AND REPAIRING ELECTRICAL SYSTEMS--The student will be able to:

- 05.01 Test and service batteries.
- 05.02 Test and repair starting systems.
- 05.03 Test and repair DC charging systems.
- 05.04 Test and repair AC charging systems.
- 05.05 Test and repair ignition systems.
- 05.06 Test and repair lighting and accessories systems.
- 05.07 Test and service instruments and gauges.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8742040
Course Title: Diesel Engine Mechanics 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for reconditioning diesel fuel injection systems.

06.0 DEMONSTRATE PROFICIENCY IN RECONDITIONING DIESEL FUEL INJECTION SYSTEMS--The student will be able to:

06.01 Identify fuel injection systems principles and components.
06.02 Troubleshoot fuel injection systems and components.
06.03 Remove, replace and adjust fuel injection systems and components.
06.04 Identify governor types and operating principles.
06.05 Troubleshoot governors.
06.06 Remove, repair or replace and adjust governors.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8742050
Course Title: Diesel Engine Mechanics 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for reconditioning diesel engine components.

07.0 DEMONSTRATE PROFICIENCY IN RECONDITIONING DIESEL ENGINE COMPONENTS--The student will be able to:

07.01 Explain the basic principles of the operation of the two-and four-stroke cycle diesel engine.
07.02 Identify engine assemblies and systems.
07.03 Diagnose valve and head problems by use of the visual inspection method.
07.04 Diagnose valve and head problems by use of the compression tester method or cylinder air pressure method.
07.05 Diagnose valve and head problems by use of the stethoscope method.
07.06 Disassemble engines.
07.07 Clean and inspect heads for cracks, warpage and injector sleeves.
07.08 Inspect valves for warpage, burns, cracks, stem wear, tip wear and valve seat.
07.09 Grind valve seats and reface valves.
07.10 Check and inspect springs for free height, distortion and installed height.
07.11 Adjust valve lash.
07.12 Remove and inspect camshaft bearings and lifters.
07.13 Time valve drive assemblies.
07.14 Remove pistons from rod assemblies.
07.15 Measure out-of-round and cylinder taper with a dial bore gauge or micrometer.
07.16 Check piston pins and boss for wear.
07.17 Measure piston ring lands width, out-of-round and taper.
07.18 Measure the piston ring gap in a cylinder bore.
07.19 Install and fit piston pins.
07.20 Check rod and piston assembly alignment.
07.21 Remove and replace rod bearings.
07.22 Hone and clean cylinders.
07.23 Install rings on pistons.
07.24 Measure and check crankshafts with a micrometer.
07.25 Check the bearing bore with a telescoping gauge.
07.26 Reassemble engines using a plastic gauge.
07.27 Install oil seals.
07.28 Check for end play.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8742060
Course Title: Diesel Engine Mechanics 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for overhauling diesel engines and performing diesel engine preventive maintenance.

08.0 DEMONSTRATE PROFICIENCY IN OVERHAULING DIESEL ENGINES (TWO-STROKE AND FOUR-STROKE CYCLE ENGINES)--The student will be able to:

- 08.01 Troubleshoot and diagnose engine problems.
- 08.02 Remove and install electrical equipment.
- 08.03 Recondition turbochargers, blowers and superchargers.
- 08.04 Recondition cooling systems.
- 08.05 Recondition intake and exhaust manifolds.
- 08.06 Recondition fans, vibrator dampers and front pulleys.
- 08.07 Recondition air compressors.
- 08.08 Recondition flywheels
- 08.09 Recondition flywheel housings.
- 08.10 Recondition lubrication systems.
- 08.11 Recondition front covers.
- 08.12 Remove and install fuel systems.
- 08.13 Recondition cylinder heads.
- 08.14 Recondition cylinder sleeves and pistons.
- 08.15 Recondition camshafts and accessory drives.
- 08.16 Recondition crankshafts.
- 08.17 Recondition cylinder blocks.
- 08.18 Perform dynamometer tests.

09.0 DEMONSTRATE PROFICIENCY IN PERFORMING DIESEL ENGINE PREVENTIVE MAINTENANCE (PM)--The student will be able to:

- 09.01 Perform PM inspection "A"
- 09.02 Perform PM inspection "B"
- 09.03 Perform PM inspection "C"

10.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 10.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 10.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 10.03 Read and follow written and oral instructions.
- 10.04 Answer and ask questions coherently and concisely.

10.05 Read critically by recognizing assumptions and implications and by evaluating ideas.

10.06 Demonstrate appropriate telephone/communication skills.

11.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

11.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

11.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

11.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

11.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

11.05 Demonstrate an understanding of federal, state and local taxes and their computation.

12.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

12.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

12.02 Draw conclusions or make inferences from data.

12.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

12.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

14.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

14.01 Define entrepreneurship.

14.02 Describe the importance of entrepreneurship to the American economy.

14.03 List the advantages and disadvantages of business ownership.

14.04 Identify the risks involved in ownership of a business.

14.05 Identify the necessary personal characteristics of a successful entrepreneur.

14.06 Identify the business kills needed to operate a small business efficiently and effectively.

Florida Department of Education
CLUSTER CURRICULUM FRAMEWORK

Cluster Title:	Drafting
Cluster Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	One Core, Six Programs, And Nine Occupational Completion Points

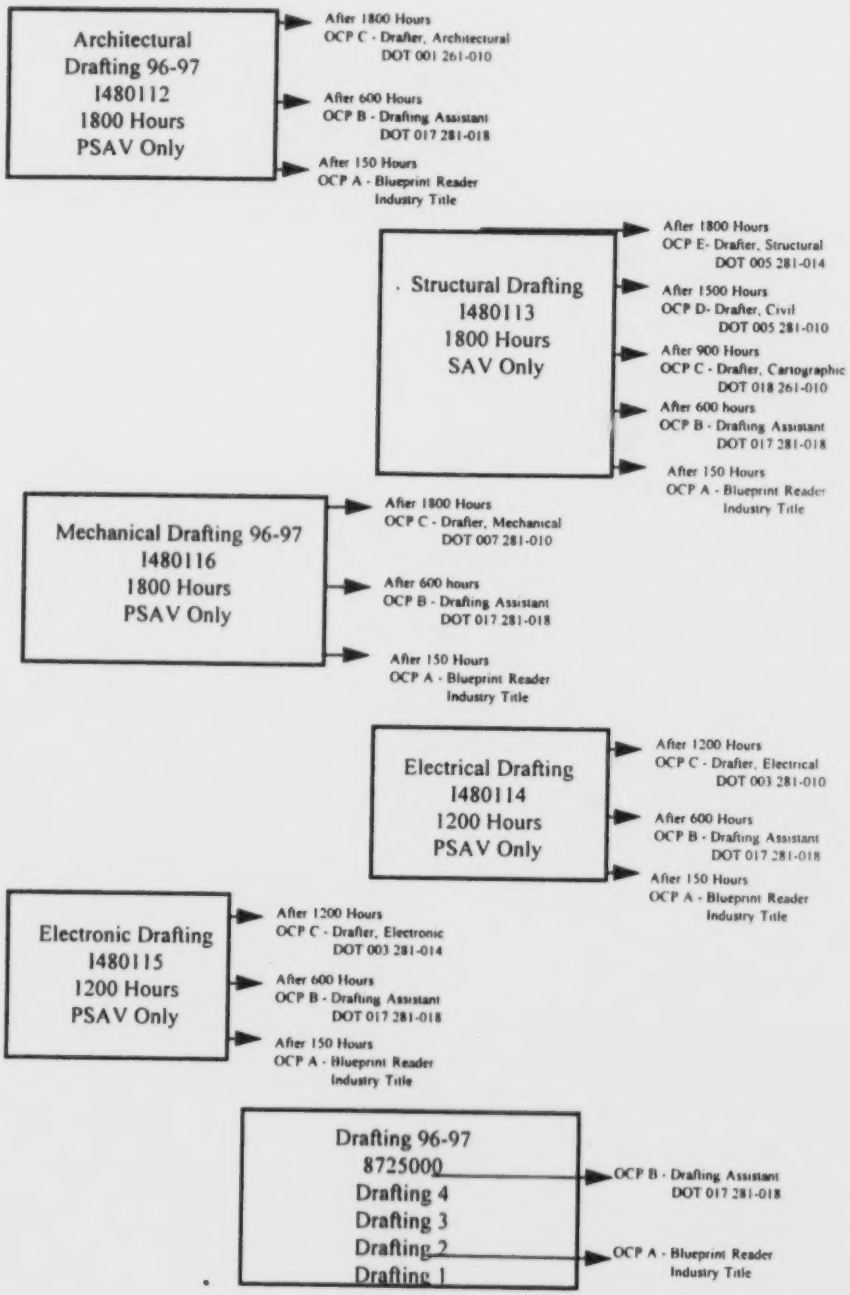
	SECONDARY	PSAV
Grade Level	9-12, 30, 31	30,31
Facility Code	245	245
VSO	VICA	VICA, American Drafting and Design Assoc.
Coop Method	Yes	Yes
Apprenticeship	Yes	Yes

I. **PURPOSE:** The purpose of the programs in this cluster is to prepare students for employment or advanced training in the drafting industries. The programs in this cluster also provide supplemental training for persons previously or currently employed in the drafting field.

This program focuses on broad, transferable skills and stresses the understanding of all aspects of the drafting industry and demonstrates such elements of the drafting industry as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

II. **CLUSTER STRUCTURE:** This cluster is a planned sequence of instruction consisting of six programs that include: Drafting 96-97 (secondary), Architectural Drafting 96-97, Structural Drafting, Mechanical Drafting 96-97, Electrical Drafting and Electronic Drafting. When the recommended sequence is followed, the structure will allow students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training program or become an occupational completer.

The following diagram illustrates the cluster structure:



Students who are enrolled in Drafting 96-97 will not be required to repeat those outcomes at the Postsecondary level.

Core

8725010 - Drafting 1
8725020 - Drafting 2
8725030 - Drafting 3
8725040 - Drafting 4

III. **LABORATORY ACTIVITIES:** Classroom, shop and land laboratory activities are an integral part of this program. These activities provide instruction in the use and care of tools, equipment, materials, and processes found in the industry.

IV. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., and the American Drafting and Design Association are the appropriate vocational student organizations for providing leadership training and reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The programs in this cluster may be offered in PSAV courses. Vocational credit shall be awarded to the student on a transcript in accordance with section 230.643, F.S.

The cooperative method of instruction (OJT) is appropriate for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks which are relevant to the occupations which the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for postsecondary adult vocational students to exit the programs in this cluster are listed at the program level or at the occupational completion points within the program. These grade level numbers correspond to a grade equivalent score obtained on one of the state designated basic skills examinations. If a student does not meet the basic skills level required for completion from the system, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) or remedial lab. Please reference the Rule for exemptions.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

When a secondary student with a disability is enrolled in a vocational class with modifications to the cluster framework, the particular outcomes and student performance standards which the handicapped student must master to earn credit must be specified in the student's Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) Competencies, instructional strategies for this program must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate the methods to improve student's personal qualities and higher-order thinking skills.

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Florida Department of Education
INTENDED OUTCOMES

	Secondary
Program Number:	**8725000**
CIP Number:	0648.010102
Grade Level:	9-12, 30, 31
Length:	4 credits
Certification:	DRAFTING @7 G
	TEC CONTR @7 G
	BLDG CONST @7 G
	TEC DRAFT @7 G

INTENDED OUTCOMES: After successfully completing this program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
BLUEPRINT READER - Industry Title

01.0 Apply basic drafting skills.
02.0 Apply fundamental computer skills.
03.0 Prepare multi-view drawings.
04.0 Prepare sectional views.
05.0 Prepare auxiliary drawings.
06.0 Apply basic dimensioning.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
DRAFTING ASSISTANT - DOT Code 017.281-018

07.0 Prepare pictorial drawings.
08.0 Prepare surface developments.
09.0 Prepare basic architectural drawings.
10.0 Demonstrate an understanding of basic civil drawings.
11.0 Demonstrate basic electrical/electronic literacy.
12.0 Prepare basic computer aided drawings.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate applied math skills.
15.0 Demonstrate basic science as applied to drafting.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Drafting 96-97
Secondary Number: 8725000
Postsecondary Number:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
BLUEPRINT READER - Industry Title

01.0 APPLY BASIC DRAFTING SKILLS--The student will be able to:

- 01.01 Use drafting equipment, measuring scales, drafting instruments and reproduction equipment.
- 01.02 Identify and use the various drafting media and techniques.
- 01.03 Demonstrate the use of the alphabet of lines.
- 01.04 Prepare title blocks and other drafting formats.
- 01.05 Use various freehand and other lettering techniques.
- 01.06 Prepare axonometric, oblique and perspective freehand sketches.
- 01.07 Prepare charts, graphs, and diagrams.
- 01.08 Apply geometric construction techniques.

02.0 APPLY FUNDAMENTAL COMPUTER SKILLS--The student will be able to:

- 02.01 Demonstrate care of equipment.
- 02.02 Operate a mouse, keyboard and digitizer as input devices.
- 02.03 Operate printers and plotters as output devices.
- 02.04 Demonstrate handling and operation of storage media.
- 02.05 Start and shut down a work station.
- 02.06 Adjust monitor controls for maximum comfort and usability.
- 02.07 Perform basic operating system functions.
- 02.08 Start and exit a software program as required.
- 02.09 Demonstrate file management techniques of copying and deleting.
- 02.10 Format a floppy disk.
- 02.11 Identify, create, and use directory structure and change directory paths.
- 02.12 Demonstrate file maintenance and backup procedures.
- 02.13 Save drawings to storage devices.

03.0 PREPARE MULTI-VIEW DRAWINGS--The student will be able to:

- 03.01 Prepare multi-view freehand sketches.
- 03.02 Select drawing scale, views and layout.
- 03.03 Prepare drawings containing horizontal, vertical and inclined surfaces.
- 03.04 Prepare drawings containing circles and/or arcs.
- 03.05 Prepare drawings incorporating removed details and conventional breaks.

04.0 PREPARE SECTIONAL VIEWS--The student will be able to:

- 04.01 Prepare drawings containing full sections and half sections.
- 04.02 Prepare drawings containing offset sections.

04.03 Prepare drawings containing revolved sections.
04.04 Prepare drawings containing removed sections and broken-out sections.
04.05 Prepare an assembly drawing applying material symbols.

05.0 PREPARE AUXILIARY DRAWINGS--The student will be able to:

05.01 Prepare drawings containing primary auxiliary views.
05.02 Prepare drawings containing auxiliary views that include curved lines.

06.0 APPLY BASIC DIMENSIONING--The student will be able to:

06.01 Prepare drawings containing linear, angular, and circular standard dimensions.
06.02 Prepare drawings using metric dimensions.
06.03 Prepare drawings using general and local notes.
06.04 Employ basic tolerancing techniques.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
DRAFTING ASSISTANT - DOT Code 017.281-018

07.0 PREPARE PICTORIAL DRAWINGS--The student will be able to:

07.01 Prepare isometric, oblique and other pictorial drawings.
07.02 Prepare one- and two-point perspectives.

08.0 PREPARE SURFACE DEVELOPMENTS--The student will be able to:

08.01 Prepare developments of prisms, cylinders, cones and pyramids.
08.02 Prepare developments of a transition piece.
08.03 Prepare drawings involving intersecting pieces.

09.0 PREPARE BASIC ARCHITECTURAL DRAWINGS--The student will be able to:

09.01 Prepare site plan.
09.02 Prepare floor plan.
09.03 Prepare exterior elevations.
09.04 Prepare roof plan.

10.0 DEMONSTRATE AN UNDERSTANDING OF BASIC CIVIL DRAWINGS--The student will be able to:

10.01 Understand civil terminology.
10.02 Read and interpret civil drawings.
10.03 Prepare plan and profile drawings.
10.04 Develop topographic drawings.

11.0 DEMONSTRATE ELECTRICAL/ELECTRONIC LITERACY--The student will be able to:

11.01 Identify electrical/electronic symbols.
11.02 Read and interpret basic schematic diagrams.

12.0 PERFORM BASIC COMPUTER AIDED DRAFTING FUNCTIONS--The student will be able to:

12.01 Perform drawing set up.
12.02 Construct geometric figures of lines, splines, circles, and arcs.
12.03 Create and edit text using appropriate style and size to annotate drawings.
12.04 Use and control accuracy enhancement tools for entity positioning methods such as snap and XYZ.
12.05 Identify, create, store and use standard part symbols and libraries.
12.06 Utilize editing commands.
12.07 Control entity properties by layer, color and line type.
12.08 Use viewing commands to perform zooming and panning.
12.09 Plot drawings on media using layout and scale.
12.10 Minimize file size.
12.11 Use query commands to interrogate database for entity characteristics, distance, area and status.
12.12 Apply standard dimensioning rules.

13.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

13.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
13.02 Read written and follow oral instructions.
13.03 Answer and ask questions coherently and concisely.
13.04 Read critically by recognizing assumptions and implications and by evaluating ideas.
13.05 Demonstrate appropriate telephone/communication skills.
13.06 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.

14.0 DEMONSTRATE APPLIED MATH SKILLS--The student will be able to:

14.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
14.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
14.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
14.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
14.05 Demonstrate an understanding of federal, state and local taxes and their computation.
14.06 Solve arithmetic problems.
14.07 Solve algebra problems.
14.08 Solve right-angle trigonometric problems.
14.09 Solve geometry problems.
14.10 Employ multiple discipline calculations and conversion tables using fraction, decimals and metric measurements.

15.0 DEMONSTRATE BASIC SCIENCE AS APPLIED TO DRAFTING--The student will be able to:

15.01 Draw conclusions or make inferences from data.
15.02 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Prepare documents which may be required when applying for a job interview including a resume, portfolio and job application form.
16.04 Demonstrate competence in job interview techniques.
16.05 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
16.06 Identify acceptable work habits.
16.07 Demonstrate knowledge of how to make job changes appropriately.
16.08 Demonstrate acceptable employee health habits.
16.09 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.
16.10 Identify or demonstrate acceptable personal grooming habits.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define entrepreneurship.
17.02 Describe the importance of entrepreneurship to the American economy.
17.03 List the advantages and disadvantages of business ownership.
17.04 Identify the risks involved in ownership of a business.
17.05 Identify the necessary personal characteristics of a successful entrepreneur.
17.06 Identify the business skills needed to operate a small business efficiently and effectively.
17.07 Identify basic occupational licensing and insurance.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8725010
Course Title: Drafting 1
Course Credit: 1

COURSE DESCRIPTION:

01.0 APPLY BASIC DRAFTING SKILLS--The student will be able to:

- 01.01 Use drafting equipment, measuring scales, drafting instruments and reproduction equipment.
- 01.02 Identify and use the various drafting media and techniques.
- 01.03 Demonstrate the use of the alphabet of lines.
- 01.04 Prepare title blocks and other drafting formats.
- 01.05 Use various freehand and other lettering techniques.
- 01.06 Prepare axonometric, oblique and perspective freehand sketches.
- 01.07 Prepare charts, graphs, and diagrams.
- 01.08 Apply geometric construction techniques.

02.0 SOLVE TECHNICAL MATHEMATICAL PROBLEMS--The student will be able to:

- 02.01 Solve arithmetic problems.
- 02.02 Solve algebra problems.
- 02.03 Solve right-angle trigonometric problems.
- 02.04 Solve geometry problems.
- 02.05 Apply multiple discipline calculations.

03.0 PREPARE MULTI-VIEW DRAWINGS--The student will be able to:

- 03.01 Prepare multi-view freehand sketches.
- 03.02 Select proper drawing scale, views and layout.
- 03.03 Prepare drawings containing horizontal and vertical surfaces.
- 03.04 Prepare drawings containing circles and/or arcs.
- 03.05 Prepare drawings incorporating removed details and conventional breaks.

04.0 PREPARE SECTIONAL VIEWS--The student will be able to:

- 04.01 Prepare drawings containing full sections and half sections.
- 04.02 Prepare drawings containing offset sections.
- 04.03 Prepare drawings containing revolved sections.
- 04.04 Prepare drawings containing removed sections and broken-out sections.
- 04.05 Prepare a sectional assembly drawing applying material symbols.

05.0 PREPARE AUXILIARY DRAWINGS--The student will be able to:

- 05.01 Prepare drawings containing primary auxiliary views.
- 05.02 Prepare drawings containing auxiliary views that include curved lines.

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06.0 APPLY BASIC DIMENSIONING--The student will be able to:

06.01 Prepare drawings containing linear, angular, and circular standard dimensions.
06.02 Prepare drawings using metric dimensions.
06.03 Prepare drawings using general and local notes.
06.04 Apply basic tolerancing techniques.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8725020
Course Title: Drafting 2
Course Credit: 1

COURSE DESCRIPTION:

07.0 PREPARE PICTORIAL DRAWINGS--The student will be able to:

- 07.01 Prepare isometric, oblique and other pictorial drawings.
- 07.02 Prepare one- and two-point perspectives.

08.0 PREPARE SURFACE DEVELOPMENTS--The student will be able to:

- 08.01 Prepare developments of prisms, cylinders, cones and pyramids.
- 08.02 Prepare developments of a transition piece.
- 08.03 Prepare drawings involving intersecting pieces.

09.0 PREPARE BASIC ARCHITECTURAL DRAWINGS--The student will be able to:

- 09.01 Prepare site plan.
- 09.02 Prepare floor plan.
- 09.03 Prepare exterior elevations.
- 09.04 Prepare roof plan.

10.0 DEMONSTRATE AN UNDERSTANDING OF BASIC CIVIL DRAWINGS--The student will be able to:

- 10.01 Understand civil terminology.
- 10.02 Read and interpret civil drawings.
- 10.03 Prepare plan and profile drawings.
- 10.04 Develop topographic drawings.

11.0 DEMONSTRATE ELECTRICAL/ELECTRONIC LITERACY--The student will be able to:

- 11.01 Identify electrical/electronic symbols.
- 11.02 Prepare schematic/block diagrams.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8725030
Course Title: Drafting 3
Course Credit: 1

COURSE DESCRIPTION:

12.0 PERFORM BASIC COMPUTER AIDED DRAFTING FUNCTIONS--The student will be able to:

- 12.01 Perform drawing set up.
- 12.02 Construct geometric figures of lines, splines, circles, andarcs.
- 12.03 Create and edit text using appropriate style and size to annotate drawings.
- 12.04 Use and control accuracy enhancement tools for entity positioning methods such as snap and XYZ.
- 12.05 Identify, create, store and use standard part symbols and libraries.
- 12.06 Utilize editing commands.
- 12.07 Control entity properties by layer, color and line type.
- 12.08 Use viewing commands to perform zooming and panning.
- 12.09 Plot drawings on media using layout and scale.
- 12.10 Minimize file size.
- 12.11 Use query commands to interrogate database for entity characteristics, distance, area and status.
- 12.12 Apply standard dimensioning rules.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8725040
Course Title: Drafting 4
Course Credit: 1

COURSE DESCRIPTION:

13.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 13.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 13.02 Read written and follow oral instructions.
- 13.03 Answer and ask questions coherently and concisely.
- 13.04 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 13.05 Demonstrate appropriate telephone/communication skills.
- 13.06 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.

14.0 DEMONSTRATE APPLIED MATH SKILLS--The student will be able to:

- 14.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 14.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 14.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 14.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 14.05 Demonstrate an understanding of federal, state and local taxes and their computation.
- 14.06 Solve arithmetic problems.
- 14.07 Solve algebra problems.
- 14.08 Solve right-angle trigonometric problems.
- 14.09 Solve geometry problems.
- 14.10 Employ multiple discipline calculations and conversion tables using fractions, decimals and metric measurements.

15.0 DEMONSTRATE BASIC SCIENCE AS APPLIED TO DRAFTING--The student will be able to:

- 15.01 Draw conclusions or make inferences from data.
- 15.02 Identify health related problems which may result from exposure to work-related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Prepare documents which may be required when applying for a job interview including a resume, portfolio and job application form.
16.04 Demonstrate competence in job interview techniques.
16.05 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
16.06 Identify acceptable work habits.
16.07 Demonstrate knowledge of how to make job changes appropriately.
16.08 Demonstrate acceptable employee health habits.
16.09 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.
16.10 Identify or demonstrate acceptable personal grooming habits.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define entrepreneurship.
17.02 Describe the importance of entrepreneurship to the American economy.
17.03 List the advantages and disadvantages of business ownership.
17.04 Identify the risks involved in ownership of a business.
17.05 Identify the necessary personal characteristics of a successful entrepreneur.
17.06 Identify the business skills needed to operate a small business efficiently and effectively.
17.07 Identify basic occupational licensing and insurance.

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Florida Department of Education
INTENDED OUTCOMES

Program Title: Architectural Drafting 96-97

PSAV

Program Numbers	**I480112**
CIP Number	0648.010201
Grade Level	30, 31
Length	1800 hours
Certification	DRAFTING @7 G
Basic Skills	
Math	9
Language	9
Reading	9

INTENDED OUTCOMES: After successfully completing this program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
BLUEPRINT READER - Industry Title

01.0 Apply basic drafting skills.
02.0 Apply fundamental computer skills.
03.0 Prepare multi-view drawings.
04.0 Prepare sectional views.
05.0 Prepare auxiliary drawings.
06.0 Apply basic dimensioning.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
DRAFTING ASSISTANT - DOT Code 017.281-018

07.0 Prepare pictorial drawings.
08.0 Prepare surface developments.
09.0 Prepare basic architectural drawings.
10.0 Demonstrate an understanding of basic civil drawings.
11.0 Demonstrate basic electrical/electronic literacy.
12.0 Prepare basic computer aided drawings.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate applied math skills.
15.0 Demonstrate basic science as applied to drafting.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
DRAFTER, ARCHITECTURAL - DOT Code 001.261-010

18.0 Prepare pictorial drawings.
19.0 Prepare architectural drawings.
20.0 Prepare basic building utility drawings.
21.0 Prepare advanced computer aided drawings.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Architectural Drafting
Secondary Number:
Postsecondary Number: I480112

OCCUPATIONAL COMPLETION POINT - DATA CODE A
BLUEPRINT READER - Industry Title

01.0 APPLY BASIC DRAFTING SKILLS--The student will be able to:

- 01.01 Use drafting equipment, measuring scales, drafting instruments and reproduction equipment.
- 01.02 Identify and use the various drafting media and techniques.
- 01.03 Demonstrate the use of the alphabet of lines.
- 01.04 Prepare title blocks and other drafting formats.
- 01.05 Use various freehand and other lettering techniques.
- 01.06 Prepare axonometric, oblique and perspective freehand sketches.
- 01.07 Prepare charts, graphs, and diagrams.
- 01.08 Apply geometric construction techniques.

02.0 APPLY FUNDAMENTAL COMPUTER SKILLS--The student will be able to:

- 02.01 Demonstrate care of equipment.
- 02.02 Operate a mouse, keyboard and digitizer as input devices.
- 02.03 Operate printers and plotters as output devices.
- 02.04 Demonstrate handling and operation of storage media.
- 02.05 Start and shut down a work station.
- 02.06 Adjust monitor controls for maximum comfort and usability.
- 02.07 Perform basic operating system functions.
- 02.08 Start and exit a software program as required.
- 02.09 Demonstrate file management techniques of copying and deleting.
- 02.10 Format a floppy disk.
- 02.11 Identify, create, and use directory structure and change directory paths.
- 02.12 Demonstrate file maintenance and backup procedures.
- 02.13 Save drawings to storage devices.

03.0 PREPARE MULTI-VIEW DRAWINGS--The student will be able to:

- 03.01 Prepare multi-view freehand sketches.
- 03.02 Select drawing scale, views and layout.
- 03.03 Prepare drawings containing horizontal, vertical and inclined surfaces.
- 03.04 Prepare drawings containing circles and/or arcs.
- 03.05 Prepare drawings incorporating removed details and conventional breaks.

04.0 PREPARE SECTIONAL VIEWS--The student will be able to:

- 04.01 Prepare drawings containing full sections and half sections.
- 05.02 Prepare drawings containing offset sections.
- 04.03 Prepare drawings containing revolved sections.
- 04.04 Prepare drawings containing removed sections and broken-out sections.
- 04.05 Prepare an assembly drawing applying material symbols.

05.0 PREPARE AUXILIARY DRAWINGS--The student will be able to:

- 05.01 Prepare drawings containing primary auxiliary views.
- 05.02 Prepare drawings containing auxiliary views that include curved lines.

06.0 APPLY BASIC DIMENSIONING--The student will be able to:

- 06.01 Prepare drawings containing linear, angular, and circular standard dimensions.
- 06.02 Prepare drawings using metric dimensions.
- 06.03 Prepare drawings using general and local notes.
- 06.04 Employ basic tolerancing techniques.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
DRAFTING ASSISTANT - DOT Code 017.281-018

07.0 PREPARE PICTORIAL DRAWINGS--The student will be able to:

- 07.01 Prepare isometric, oblique and other pictorial drawings.
- 07.02 Prepare one- and two-point perspectives.

08.0 PREPARE SURFACE DEVELOPMENTS--The student will be able to:

- 08.01 Prepare developments of prisms, cylinders, cones and pyramids.
- 08.02 Prepare developments of a transition piece.
- 08.03 Prepare drawings involving intersecting pieces.

09.0 PREPARE BASIC ARCHITECTURAL DRAWINGS--The student will be able to:

- 09.01 Prepare site plan.
- 09.02 Prepare floor plan.
- 09.03 Prepare exterior elevations.
- 09.04 Prepare roof plan.

10.0 DEMONSTRATE AN UNDERSTANDING OF BASIC CIVIL DRAWINGS--The student will be able to:

- 10.01 Understand civil terminology.
- 10.02 Read and interpret civil drawings.
- 10.03 Prepare plan and profile drawings.
- 10.04 Develop topographic drawings.

11.0 DEMONSTRATE ELECTRICAL/ELECTRONIC LITERACY--The student will be able to:

11.01 Identify electrical/electronic symbols.
11.02 Read and interpret basic schematic diagrams.

12.0 PERFORM BASIC COMPUTER AIDED DRAFTING FUNCTIONS--The student will be able to:

12.01 Perform drawing set up.
12.02 Construct geometric figures of lines, splines, circles, and arcs.
12.03 Create and edit text using appropriate style and size to annotate drawings.
12.04 Use and control accuracy enhancement tools for entity positioning methods such as snap and XYZ.
12.05 Identify, create, store and use standard part symbols and libraries.
12.06 Utilize editing commands.
12.07 Control entity properties by layer, color and line type.
12.08 Use viewing commands to perform zooming and panning.
12.09 Plot drawings on media using layout and scale.
12.10 Minimize file size.
12.11 Use query commands to interrogate database for entity characteristics, distance, area and status.
12.12 Apply standard dimensioning rules.

13.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

13.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
13.02 Read written and follow oral instructions.
13.03 Answer and ask questions coherently and concisely.
13.04 Read critically by recognizing assumptions and implications and by evaluating ideas.
13.05 Demonstrate appropriate telephone/communication skills.
13.06 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.

14.0 DEMONSTRATE APPLIED MATH SKILLS--The student will be able to:

14.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
14.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
14.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
14.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

14.05 Demonstrate an understanding of federal, state and local taxes and their computation.
14.06 Solve arithmetic problems.
14.07 Solve algebra problems.
14.08 Solve right-angle trigonometric problems.
14.09 Solve geometry problems.
14.10 Employ multiple discipline calculations and conversion tables using fraction, decimals and metric measurements.

15.0 DEMONSTRATE BASIC SCIENCE AS APPLIED TO DRAFTING--The student will be able to:

15.01 Draw conclusions or make inferences from data.
15.02 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Prepare documents which may be required when applying for a job interview including a resume, portfolio and job application form.
16.04 Demonstrate competence in job interview techniques.
16.05 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
16.06 Identify acceptable work habits.
16.07 Demonstrate knowledge of how to make job changes appropriately.
16.08 Demonstrate acceptable employee health habits.
16.09 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.
16.10 Identify or demonstrate acceptable personal grooming habits.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define entrepreneurship.
17.02 Describe the importance of entrepreneurship to the American economy.
17.03 List the advantages and disadvantages of business ownership.
17.04 Identify the risks involved in ownership of a business.
17.05 Identify the necessary personal characteristics of a successful entrepreneur.
17.06 Identify the business skills needed to operate a small business efficiently and effectively.
17.07 Identify basic occupational licensing and insurance.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
DRAFTER, ARCHITECTURAL - DOT Code 001.261-010

18.0 PREPARE PICTORIAL DRAWINGS--The student will be able to.

- 18.01 Prepare isometric drawings
- 18.02 Prepare oblique drawings
- 18.03 Prepare perspectives

19.0 PREPARE ARCHITECTURAL DRAWINGS--The student will be able to.

- 19.01 Interpret catalogs, specifications, technical tables, codes and ordinances
- 19.02 Prepare floor plan drawings, with dimensions
- 19.03 Prepare foundation plan and detail drawings, with dimensions
- 19.04 Prepare roof plans
- 19.05 Prepare elevation drawings
- 19.06 Prepare sections and details
- 19.07 Prepare schedules and cost estimates
- 19.08 Prepare a landscape layout

20.0 PREPARE BASIC BUILDING UTILITY DRAWINGS--The student will be able to:

- 20.01 Prepare electrical plans and schedules
- 20.02 Prepare HVAC plans and schedules
- 20.03 Prepare plumbing plans, riser diagram, and schedules

21.0 PREPARE ADVANCED COMPUTER AIDED DRAWINGS--The student will be able to:

- 21.01 Produce architectural drawings
- 21.02 Produce structural plans and detail drawings
- 21.04 Produce civil drawings

Florida Department of Education
INTENDED OUTCOMES

Program Title: Structural Drafting

PSAV

Program Numbers	**I480113**
CIP Number	0648.010301
Grade Level	30, 31
Length	1800 hours
Certification	DRAFTING @7 G
Basic Skills	
Math	9
Language	9
Reading	9

INTENDED OUTCOMES: After successfully completing this program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
BLUEPRINT READER - Industry Title

01.0 Apply basic drafting skills.
02.0 Apply fundamental computer skills.
03.0 Prepare multi-view drawings.
04.0 Prepare sectional views.
05.0 Prepare auxiliary drawings.
06.0 Apply basic dimensioning.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
DRAFTING ASSISTANT - DOT Code 017.281-018

07.0 Prepare pictorial drawings.
08.0 Prepare surface developments.
09.0 Prepare basic architectural drawings.
10.0 Demonstrate an understanding of basic civil drawings.
11.0 Demonstrate basic electrical/electronic literacy.
12.0 Prepare basic computer aided drawings.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate applied math skills.
15.0 Demonstrate basic science as applied to drafting.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
DRAFTER,CARTOGRAPHIC - DOT Code 018.261-010

22.0 Prepare map drawings.
23.0 Prepare computer aided map details.
24.0 Understand surveying and mapping procedures.
25.0 Prepare basic civil drawings.

OCCUPATIONAL COMPLETION POINT - DATA CODE D

DRAFTER, CIVIL - DOT Code 005.281-010

26.0 Prepare advanced architectural drawings.
27.0 Prepare structural details.
28.0 Prepare map drawings.
29.0 Prepare advanced civil drawings.

OCCUPATIONAL COMPLETION POINT - DATA CODE E

DRAFTER, STRUCTURAL - DOT Code 005.281-014

30.0 Prepare structural steel drawings.
31.0 Prepare reinforced concrete drawings.
32.0 Prepare structural wood drawings.
33.0 Prepare advanced computer aided drawings, two-dimensional and three-dimensional.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Structural Drafting
Secondary Number:
Postsecondary Number: I480113

OCCUPATIONAL COMPLETION POINT - DATA CODE A
BLUEPRINT READER - Industry Title

01.0 APPLY BASIC DRAFTING SKILLS--The student will be able to:

- 01.01 Use drafting equipment, measuring scales, drafting instruments and reproduction equipment.
- 01.02 Identify and use the various drafting media and techniques.
- 01.03 Demonstrate the use of the alphabet of lines.
- 01.04 Prepare title blocks and other drafting formats.
- 01.05 Use various freehand and other lettering techniques.
- 01.06 Prepare axonometric, oblique and perspective freehand sketches.
- 01.07 Prepare charts, graphs, and diagrams.
- 01.08 Apply geometric construction techniques.

02.0 APPLY FUNDAMENTAL COMPUTER SKILLS--The student will be able to:

- 02.01 Demonstrate care of equipment.
- 02.02 Operate a mouse, keyboard and digitizer as input devices.
- 02.03 Operate printers and plotters as output devices.
- 02.04 Demonstrate handling and operation of storage media.
- 02.05 Start and shut down a work station.
- 02.06 Adjust monitor controls for maximum comfort and usability.
- 02.07 Perform basic operating system functions.
- 02.08 Start and exit a software program as required.
- 02.09 Demonstrate file management techniques of copying and deleting.
- 02.10 Format a floppy disk.
- 02.11 Identify, create, and use directory structure and change directory paths.
- 02.12 Demonstrate file maintenance and backup procedures.
- 02.13 Save drawings to storage devices.

03.0 PREPARE MULTI-VIEW DRAWINGS--The student will be able to:

- 03.01 Prepare multi-view freehand sketches.
- 03.02 Select drawing scale, views and layout.
- 03.03 Prepare drawings containing horizontal, vertical and inclined surfaces.
- 03.04 Prepare drawings containing circles and/or arcs.
- 03.05 Prepare drawings incorporating removed details and conventional breaks.

04.0 PREPARE SECTIONAL VIEWS--The student will be able to:

- 04.01 Prepare drawings containing full sections and half sections.
- 05.02 Prepare drawings containing offset sections.
- 04.03 Prepare drawings containing revolved sections.
- 04.04 Prepare drawings containing removed sections and broken-out sections.
- 04.05 Prepare an assembly drawing applying material symbols.

05.0 PREPARE AUXILIARY DRAWINGS--The student will be able to:

- 05.01 Prepare drawings containing primary auxiliary views.
- 05.02 Prepare drawings containing auxiliary views that include curved lines.

06.0 APPLY BASIC DIMENSIONING--The student will be able to:

- 06.01 Prepare drawings containing linear, angular, and circular standard dimensions.
- 06.02 Prepare drawings using metric dimensions.
- 06.03 Prepare drawings using general and local notes.
- 06.04 Employ basic tolerancing techniques.

OCCUPATIONAL COMPLETION POINT - DATA CODE B

DRAFTING ASSISTANT - DOT Code 017.281-018

07.0 PREPARE PICTORIAL DRAWINGS--The student will be able to:

- 07.01 Prepare isometric, oblique and other pictorial drawings.
- 07.02 Prepare one- and two-point perspectives.

08.0 PREPARE SURFACE DEVELOPMENTS--The student will be able to:

- 08.01 Prepare developments of prisms, cylinders, cones and pyramids.
- 08.02 Prepare developments of a transition piece.
- 08.03 Prepare drawings involving intersecting pieces.

09.0 PREPARE BASIC ARCHITECTURAL DRAWINGS--The student will be able to:

- 09.01 Prepare site plan.
- 09.02 Prepare floor plan.
- 09.03 Prepare exterior elevations.
- 09.04 Prepare roof plan.

10.0 DEMONSTRATE AN UNDERSTANDING OF BASIC CIVIL DRAWINGS--The student will be able to:

- 10.01 Understand civil terminology.
- 10.02 Read and interpret civil drawings.
- 10.03 Prepare plan and profile drawings.
- 10.04 Develop topographic drawings.

11.0 DEMONSTRATE ELECTRICAL/ELECTRONIC LITERACY--The student will be able to:

11.01 Identify electrical/electronic symbols.
11.02 Read and interpret basic schematic diagrams.

12.0 PERFORM BASIC COMPUTER AIDED DRAFTING FUNCTIONS--The student will be able to:

12.01 Perform drawing set up.
12.02 Construct geometric figures of lines, splines, circles, and arcs.
12.03 Create and edit text using appropriate style and size to annotate drawings.
12.04 Use and control accuracy enhancement tools for entity positioning methods such as snap and XYZ.
12.05 Identify, create, store and use standard part symbols and libraries.
12.06 Utilize editing commands.
12.07 Control entity properties by layer, color and line type.
12.08 Use viewing commands to perform zooming and panning.
12.09 Plot drawings on media using layout and scale.
12.10 Minimize file size.
12.11 Use query commands to interrogate database for entity characteristics, distance, area and status.
12.12 Apply standard dimensioning rules.

13.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

13.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
13.02 Read written and follow oral instructions.
13.03 Answer and ask questions coherently and concisely.
13.04 Read critically by recognizing assumptions and implications and by evaluating ideas.
13.05 Demonstrate appropriate telephone/communication skills.
13.06 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.

14.0 DEMONSTRATE APPLIED MATH SKILLS--The student will be able to:

14.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
14.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
14.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
14.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

14.05 Demonstrate an understanding of federal, state and local taxes and their computation.
14.06 Solve arithmetic problems.
14.07 Solve algebra problems.
14.08 Solve right-angle trigonometric problems.
14.09 Solve geometry problems.
14.10 Employ multiple discipline calculations and conversion tables using fraction, decimals and metric measurements.

15.0 DEMONSTRATE BASIC SCIENCE AS APPLIED TO DRAFTING--The student will be able to:

15.01 Draw conclusions or make inferences from data.
15.02 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Prepare documents which may be required when applying for a job interview including a resume, portfolio and job application form.
16.04 Demonstrate competence in job interview techniques.
16.05 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
16.06 Identify acceptable work habits.
16.07 Demonstrate knowledge of how to make job changes appropriately.
16.08 Demonstrate acceptable employee health habits.
16.09 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.
16.10 Identify or demonstrate acceptable personal grooming habits.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define entrepreneurship.
17.02 Describe the importance of entrepreneurship to the American economy.
17.03 List the advantages and disadvantages of business ownership.
17.04 Identify the risks involved in ownership of a business.
17.05 Identify the necessary personal characteristics of a successful entrepreneur.
17.06 Identify the business skills needed to operate a small business efficiently and effectively.
17.07 Identify basic occupational licensing and insurance.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
DRAFTER,CARTOGRAPHIC - DOT Code 018.261-010

22.0 PREPARE MAP DRAWINGS--The student will be able to:

22.01 Prepare traverse drawings.
22.02 Prepare plat drawings.
22.03 Prepare street layout drawings.
22.04 Prepare map drawings.

23.0 PREPARE COMPUTER AIDED MAP DETAILS--The student will be able to:

23.01 Draft range, section and township map.
23.02 Prepare a map using bearings.
23.03 Prepare a map using coordinates.
23.04 Convert map into metric dimensions.

24.0 UNDERSTAND SURVEYING AND MAPPING PROCEDURES--The student will be able to:

24.01 Employ basic mapping specifications.
24.02 Interpret aerial photogrammetry.
24.03 Employ horizontal measures.
24.04 Employ levelling procedures.
24.05 Obtain angular measurements.
24.06 Interpret legal descriptions.

25.0 PREPARE BASIC CIVIL DRAWINGS--The student will be able to:

25.01 Prepare topographic drawings.
25.02 Prepare drainage drawings.
25.03 Prepare highway drawings.

OCCUPATIONAL COMPLETION POINT - DATA CODE D
DRAFTER, CIVIL - DOT Code 005.281-010

26.0 PREPARE ADVANCED ARCHITECTURAL DRAWINGS--The student will be able to:

26.01 Prepare floor plan drawings.
26.02 Prepare foundation plan drawings.
26.03 Prepare detailed drawings.

27.0 PREPARE STRUCTURAL DETAILS--The student will be able to:

27.01 Interpret structural manuals and technical tables.
27.02 Draw structural connections.

28.0 PREPARE ADVANCED MAP DRAWINGS--The student will be able to:

28.01 Prepare traverse drawings.
28.02 Prepare street layout drawings.
28.03 Prepare advanced map drawings.
28.04 Prepare highway drawings.
28.05 Prepare topographic drawings.

29.0 PREPARE ADVANCED CIVIL DRAWINGS--The student will be able to:

29.01 Prepare drainage drawings.
29.02 Prepare plat drawings.
29.03 Prepare advanced plan and profile drawings.
29.04 Prepare utility drawings.
29.05 Prepare a commercial site plan.

OCCUPATIONAL COMPLETION POINT - DATA CODE E
DRAFTER, STRUCTURAL - DOT Code 005.281-014

30.0 PREPARE STRUCTURAL STEEL DRAWINGS--The student will be able to:

30.01 Use the "Manual of Steel Construction" and other technical data.
30.02 Interpret codes and specifications.
30.03 Calculate reactions and stresses.
30.04 Prepare shear and moment diagrams.
30.05 Detail bolted connections.
30.06 Detail welded connections.
30.07 Prepare erection plans and schedules.
30.08 Assist in the preparation of bids.
30.09 Prepare advance bill for ordering materials.

31.0 PREPARE REINFORCED CONCRETE DRAWINGS--The student will be able to:

31.01 Use the "Manual of Standard Practice for Detailing Reinforced Concrete Structures" and other technical data.
31.02 Interpret codes and specifications.
31.03 Interpret engineering drawings.
31.04 Prepare column detail drawings.
31.05 Prepare footing and foundation drawings.
31.06 Prepare floor and roof detail drawings.
31.07 Prepare special structure detail drawings.
31.08 Prepare bar lists and schedules.

32.0 PREPARE STRUCTURAL WOOD DRAWINGS--The student will be able to:

32.01 Use the "Timber Construction Manual".
32.02 Interpret codes and specifications.
32.03 Prepare fastening and connection details.
32.04 Prepare framing plans.
32.05 Assist in the preparation of bids.
32.06 Prepare advance bill for ordering materials.

33.0 PREPARE ADVANCED COMPUTER AIDED DRAWINGS, TWO-DIMENSIONAL AND THREE DIMENSIONAL--The student will be able to:

33.01 Produce architectural drawings.
33.02 Produce structural (steel, wood, reinforced concrete) drawings.
33.03 Produce map drawings.
33.04 Produce civil drawings.

Florida Department of Education
INTENDED OUTCOMES

Program Title: Electrical Drafting

PSAV

Program Numbers	**I480114**
CIP Number	0648.010401
Grade Level	30, 31
Length	1200 hours
Certification	DRAFTING @7 G
Basic Skills	
Math	9
Language	9
Reading	9

INTENDED OUTCOMES: After successfully completing this program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
BLUEPRINT READER - Industry Title

01.0 Apply basic drafting skills.
02.0 Apply fundamental computer skills.
03.0 Prepare multi-view drawings.
04.0 Prepare sectional views.
05.0 Prepare auxiliary drawings.
06.0 Apply basic dimensioning.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
DRAFTING ASSISTANT - DOT Code 017.281-018

07.0 Prepare pictorial drawings.
08.0 Prepare surface developments.
09.0 Prepare basic architectural drawings.
10.0 Demonstrate an understanding of basic civil drawings.
11.0 Demonstrate basic electrical/electronic literacy.
12.0 Prepare basic computer aided drawings.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate applied math skills.
15.0 Demonstrate basic science as applied to drafting.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
DRAFTER, ELECTRICAL - DOT Code 003.281-010

34.0 Demonstrate knowledge of electrical codes and specifications.
35.0 Prepare advanced electrical drawings.
36.0 Prepare advanced computer aided drawings

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Electrical Drafting
Secondary Number:
Postsecondary Number: I480114

OCCUPATIONAL COMPLETION POINT - DATA CODE A
BLUEPRINT READER - Industry Title

01.0 APPLY BASIC DRAFTING SKILLS--The student will be able to:

- 01.01 Use drafting equipment, measuring scales, drafting instruments and reproduction equipment.
- 01.02 Identify and use the various drafting media and techniques.
- 01.03 Demonstrate the use of the alphabet of lines.
- 01.04 Prepare title blocks and other drafting formats.
- 01.05 Use various freehand and other lettering techniques.
- 01.06 Prepare axonometric, oblique and perspective freehand sketches.
- 01.07 Prepare charts, graphs, and diagrams.
- 01.08 Apply geometric construction techniques.

02.0 APPLY FUNDAMENTAL COMPUTER SKILLS--The student will be able to:

- 02.01 Demonstrate care of equipment.
- 02.02 Operate a mouse, keyboard and digitizer as input devices.
- 02.03 Operate printers and plotters as output devices.
- 02.04 Demonstrate handling and operation of storage media.
- 02.05 Start and shut down a work station.
- 02.06 Adjust monitor controls for maximum comfort and usability.
- 02.07 Perform basic operating system functions.
- 02.08 Start and exit a software program as required.
- 02.09 Demonstrate file management techniques of copying and deleting.
- 02.10 Format a floppy disk.
- 02.11 Identify, create, and use directory structure and change directory paths.
- 02.12 Demonstrate file maintenance and backup procedures.
- 02.13 Save drawings to storage devices.

03.0 PREPARE MULTI-VIEW DRAWINGS--The student will be able to:

- 03.01 Prepare multi-view freehand sketches.
- 03.02 Select drawing scale, views and layout.
- 03.03 Prepare drawings containing horizontal, vertical and inclined surfaces.
- 03.04 Prepare drawings containing circles and/or arcs.
- 03.05 Prepare drawings incorporating removed details and conventional breaks.

04.0 PREPARE SECTIONAL VIEWS--The student will be able to:

- 04.01 Prepare drawings containing full sections and half sections.
- 05.02 Prepare drawings containing offset sections.
- 04.03 Prepare drawings containing revolved sections.
- 04.04 Prepare drawings containing removed sections and broken-out sections.
- 04.05 Prepare an assembly drawing applying material symbols.

05.0 PREPARE AUXILIARY DRAWINGS--The student will be able to:

- 05.01 Prepare drawings containing primary auxiliary views.
- 05.02 Prepare drawings containing auxiliary views that include curved lines.

06.0 APPLY BASIC DIMENSIONING--The student will be able to:

- 06.01 Prepare drawings containing linear, angular, and circular standard dimensions.
- 06.02 Prepare drawings using metric dimensions.
- 06.03 Prepare drawings using general and local notes.
- 06.04 Employ basic tolerancing techniques.

OCCUPATIONAL COMPLETION POINT - DATA CODE B

DRAFTING ASSISTANT - DOT Code 017.281-018

07.0 PREPARE PICTORIAL DRAWINGS--The student will be able to:

- 07.01 Prepare isometric, oblique and other pictorial drawings.
- 07.02 Prepare one- and two-point perspectives.

08.0 PREPARE SURFACE DEVELOPMENTS--The student will be able to:

- 08.01 Prepare developments of prisms, cylinders, cones and pyramids.
- 08.02 Prepare developments of a transition piece.
- 08.03 Prepare drawings involving intersecting pieces.

09.0 PREPARE BASIC ARCHITECTURAL DRAWINGS--The student will be able to:

- 09.01 Prepare site plan.
- 09.02 Prepare floor plan.
- 09.03 Prepare exterior elevations.
- 09.04 Prepare roof plan.

10.0 DEMONSTRATE AN UNDERSTANDING OF BASIC CIVIL DRAWINGS--The student will be able to:

- 10.01 Understand civil terminology.
- 10.02 Read and interpret civil drawings.
- 10.03 Prepare plan and profile drawings.
- 10.04 Develop topographic drawings.

11.0 DEMONSTRATE ELECTRICAL/ELECTRONIC LITERACY--The student will be able to:

11.01 Identify electrical/electronic symbols.
11.02 Read and interpret basic schematic diagrams.

12.0 PERFORM BASIC COMPUTER AIDED DRAFTING FUNCTIONS--The student will be able to:

12.01 Perform drawing set up.
12.02 Construct geometric figures of lines, splines, circles, and arcs.
12.03 Create and edit text using appropriate style and size to annotate drawings.
12.04 Use and control accuracy enhancement tools for entity positioning methods such as snap and XYZ.
12.05 Identify, create, store and use standard part symbols and libraries.
12.06 Utilize editing commands.
12.07 Control entity properties by layer, color and line type.
12.08 Use viewing commands to perform zooming and panning.
12.09 Plot drawings on media using layout and scale.
12.10 Minimize file size.
12.11 Use query commands to interrogate database for entity characteristics, distance, area and status.
12.12 Apply standard dimensioning rules.

13.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

13.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
13.02 Read written and follow oral instructions.
13.03 Answer and ask questions coherently and concisely.
13.04 Read critically by recognizing assumptions and implications and by evaluating ideas.
13.05 Demonstrate appropriate telephone/communication skills.
13.06 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.

14.0 DEMONSTRATE APPLIED MATH SKILLS--The student will be able to:

14.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
14.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
14.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
14.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

14.05 Demonstrate an understanding of federal, state and local taxes and their computation.
14.06 Solve arithmetic problems.
14.07 Solve algebra problems.
14.08 Solve right-angle trigonometric problems.
14.09 Solve geometry problems.
14.10 Employ multiple discipline calculations and conversion tables using fraction, decimals and metric measurements.

15.0 DEMONSTRATE BASIC SCIENCE AS APPLIED TO DRAFTING--The student will be able to:

15.01 Draw conclusions or make inferences from data.
15.02 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Prepare documents which may be required when applying for a job interview including a resume, portfolio and job application form.
16.04 Demonstrate competence in job interview techniques.
16.05 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
16.06 Identify acceptable work habits.
16.07 Demonstrate knowledge of how to make job changes appropriately.
16.08 Demonstrate acceptable employee health habits.
16.09 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.
16.10 Identify or demonstrate acceptable personal grooming habits.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define entrepreneurship.
17.02 Describe the importance of entrepreneurship to the American economy.
17.03 List the advantages and disadvantages of business ownership.
17.04 Identify the risks involved in ownership of a business.
17.05 Identify the necessary personal characteristics of a successful entrepreneur.
17.06 Identify the business skills needed to operate a small business efficiently and effectively.
17.07 Identify basic occupational licensing and insurance.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
DRAFTER, ELECTRICAL - DOT Code 003.281-010

34.0 DEMONSTRATE KNOWLEDGE OF ELECTRONIC CODES AND SPECIFICATIONS--The student will be able to:

34.01 Use National Electric Code Standards in preparing drawings.
34.02 Apply state electric codes to drawing specifications.
34.03 Apply local electric codes to drawing specifications.

35.0 PREPARE ELECTRICAL DRAWINGS--The student will be able to:

35.01 Apply the basic theory of electricity.
35.02 Apply the basic theory of circuitry.
35.03 Use electrical symbols.
35.04 Prepare single-line block diagrams.
35.05 Prepare a panel board schedule.

36.0 PREPARE ADVANCED COMPUTER AIDED DRAWINGS--The student will be able to:

36.01 Prepare schematic drawings.
36.02 Prepare electrical drawings.
36.03 Prepare electrical drawings.
36.04 Prepare electromechanical drawings.

Florida Department of Education
INTENDED OUTCOMES

Program Title: Electronic Drafting

PSAV

Program Numbers	**I480115**
CIP Number	0648.010402
Grade Level	30, 31
Length	1200 hours
Certification	DRAFTING @7 G
Basic Skills	
Math	9
Language	9
Reading	9

INTENDED OUTCOMES: After successfully completing this program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
BLUEPRINT READER - Industry Title

01.0 Apply basic drafting skills.
02.0 Apply fundamental computer skills.
03.0 Prepare multi-view drawings.
04.0 Prepare sectional views.
05.0 Prepare auxiliary drawings.
06.0 Apply basic dimensioning.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
DRAFTING ASSISTANT - DOT Code 017.281-018

07.0 Prepare pictorial drawings.
08.0 Prepare surface developments.
09.0 Prepare basic architectural drawings.
10.0 Demonstrate an understanding of basic civil drawings.
11.0 Demonstrate basic electrical/electronic literacy.
12.0 Prepare basic computer aided drawings.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate applied math skills.
15.0 Demonstrate basic science as applied to drafting.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
DRAFTER,ELECTRONIC - DOT Code 003.281-014

37.0 Demonstrate knowledge of electronic codes and specifications.
38.0 Prepare advanced electronic drawings.
39.0 Prepare advanced computer aided drawings.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Electronic Drafting
Secondary Number:
Postsecondary Number: I480115

OCCUPATIONAL COMPLETION POINT - DATA CODE A
BLUEPRINT READER - Industry Title

01.0 APPLY BASIC DRAFTING SKILLS--The student will be able to:

- 01.01 Use drafting equipment, measuring scales, drafting instruments and reproduction equipment.
- 01.02 Identify and use the various drafting media and techniques.
- 01.03 Demonstrate the use of the alphabet of lines.
- 01.04 Prepare title blocks and other drafting formats.
- 01.05 Use various freehand and other lettering techniques.
- 01.06 Prepare axonometric, oblique and perspective freehand sketches.
- 01.07 Prepare charts, graphs, and diagrams.
- 01.08 Apply geometric construction techniques.

02.0 APPLY FUNDAMENTAL COMPUTER SKILLS--The student will be able to:

- 02.01 Demonstrate care of equipment.
- 02.02 Operate a mouse, keyboard and digitizer as input devices.
- 02.03 Operate printers and plotters as output devices.
- 02.04 Demonstrate handling and operation of storage media.
- 02.05 Start and shut down a work station.
- 02.06 Adjust monitor controls for maximum comfort and usability.
- 02.07 Perform basic operating system functions.
- 02.08 Start and exit a software program as required.
- 02.09 Demonstrate file management techniques of copying and deleting.
- 02.10 Format a floppy disk.
- 02.11 Identify, create, and use directory structure and change directory paths.
- 02.12 Demonstrate file maintenance and backup procedures.
- 02.13 Save drawings to storage devices.

03.0 PREPARE MULTI-VIEW DRAWINGS--The student will be able to:

- 03.01 Prepare multi-view freehand sketches.
- 03.02 Select drawing scale, views and layout.
- 03.03 Prepare drawings containing horizontal, vertical and inclined surfaces.
- 03.04 Prepare drawings containing circles and/or arcs.
- 03.05 Prepare drawings incorporating removed details and conventional breaks.

04.0 PREPARE SECTIONAL VIEWS--The student will be able to:

- 04.01 Prepare drawings containing full sections and half sections.
- 05.02 Prepare drawings containing offset sections.
- 04.03 Prepare drawings containing revolved sections.
- 04.04 Prepare drawings containing removed sections and broken-out sections.
- 04.05 Prepare an assembly drawing applying material symbols.

05.0 PREPARE AUXILIARY DRAWINGS--The student will be able to:

- 05.01 Prepare drawings containing primary auxiliary views.
- 05.02 Prepare drawings containing auxiliary views that include curved lines.

06.0 APPLY BASIC DIMENSIONING--The student will be able to:

- 06.01 Prepare drawings containing linear, angular, and circular standard dimensions.
- 06.02 Prepare drawings using metric dimensions.
- 06.03 Prepare drawings using general and local notes.
- 06.04 Employ basic tolerancing techniques.

OCCUPATIONAL COMPLETION POINT - DATA CODE B

DRAFTING ASSISTANT - DOT Code 017.281-018

07.0 PREPARE PICTORIAL DRAWINGS--The student will be able to:

- 07.01 Prepare isometric, oblique and other pictorial drawings.
- 07.02 Prepare one- and two-point perspectives.

08.0 PREPARE SURFACE DEVELOPMENTS--The student will be able to:

- 08.01 Prepare developments of prisms, cylinders, cones and pyramids.
- 08.02 Prepare developments of a transition piece.
- 08.03 Prepare drawings involving intersecting pieces.

09.0 PREPARE BASIC ARCHITECTURAL DRAWINGS--The student will be able to:

- 09.01 Prepare site plan.
- 09.02 Prepare floor plan.
- 09.03 Prepare exterior elevations.
- 09.04 Prepare roof plan.

10.0 DEMONSTRATE AN UNDERSTANDING OF BASIC CIVIL DRAWINGS--The student will be able to:

- 10.01 Understand civil terminology.
- 10.02 Read and interpret civil drawings.
- 10.03 Prepare plan and profile drawings.
- 10.04 Develop topographic drawings.

11.0 DEMONSTRATE ELECTRICAL/ELECTRONIC LITERACY--The student will be able to:

11.01 Identify electrical/electronic symbols.
11.02 Read and interpret basic schematic diagrams.

12.0 PERFORM BASIC COMPUTER AIDED DRAFTING FUNCTIONS--The student will be able to:

12.01 Perform drawing set up.
12.02 Construct geometric figures of lines, splines, circles, and arcs.
12.03 Create and edit text using appropriate style and size to annotate drawings.
12.04 Use and control accuracy enhancement tools for entity positioning methods such as snap and XYZ.
12.05 Identify, create, store and use standard part symbols and libraries.
12.06 Utilize editing commands.
12.07 Control entity properties by layer, color and line type.
12.08 Use viewing commands to perform zooming and panning.
12.09 Plot drawings on media using layout and scale.
12.10 Minimize file size.
12.11 Use query commands to interrogate database for entity characteristics, distance, area and status.
12.12 Apply standard dimensioning rules.

13.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

13.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
13.02 Read written and follow oral instructions.
13.03 Answer and ask questions coherently and concisely.
13.04 Read critically by recognizing assumptions and implications and by evaluating ideas.
13.05 Demonstrate appropriate telephone/communication skills.
13.06 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.

14.0 DEMONSTRATE APPLIED MATH SKILLS--The student will be able to:

14.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
14.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
14.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
14.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

14.05 Demonstrate an understanding of federal, state and local taxes and their computation.
14.06 Solve arithmetic problems.
14.07 Solve algebra problems.
14.08 Solve right-angle trigonometric problems.
14.09 Solve geometry problems.
14.10 Employ multiple discipline calculations and conversion tables using fraction, decimals and metric measurements.

15.0 DEMONSTRATE BASIC SCIENCE AS APPLIED TO DRAFTING--The student will be able to:

15.01 Draw conclusions or make inferences from data.
15.02 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Prepare documents which may be required when applying for a job interview including a resume, portfolio and job application form.
16.04 Demonstrate competence in job interview techniques.
16.05 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
16.06 Identify acceptable work habits.
16.07 Demonstrate knowledge of how to make job changes appropriately.
16.08 Demonstrate acceptable employee health habits.
16.09 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.
16.10 Identify or demonstrate acceptable personal grooming habits.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define entrepreneurship.
17.02 Describe the importance of entrepreneurship to the American economy.
17.03 List the advantages and disadvantages of business ownership.
17.04 Identify the risks involved in ownership of a business.
17.05 Identify the necessary personal characteristics of a successful entrepreneur.
17.06 Identify the business skills needed to operate a small business efficiently and effectively.
17.07 Identify basic occupational licensing and insurance.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
DRAFTER,ELECTRONIC - DOT Code 003.281-014

37.0 DEMONSTRATE KNOWLEDGE OF ELECTRONIC CODES AND SPECIFICATIONS--The student will be able to:

37.01 Use National Electric Code Standards in preparing drawings.
37.02 Apply state electric codes to drawing specifications.
37.03 Apply local electric codes to drawing specifications.

38.0 PREPARE ADVANCED ELECTRONIC DRAWINGS--The student will be able to:

38.01 Identify electronic device symbols.
38.02 Prepare schematic drawings.
38.03 Prepare printed circuit board drawings.
38.04 Prepare package drawings.
38.05 Prepare connection drawings.
38.06 Prepare interconnection drawings.
38.07 Prepare wiring lists.
38.08 Prepare cable drawings.
38.09 Prepare harness drawings.
38.10 Prepare component drawings.
38.11 Prepare logic diagrams.
38.12 Design an electromechanical unit.

39.0 PREPARE ADVANCED COMPUTER AIDED DRAWINGS--The student will be able to:

39.01 Prepare schematic drawings.
39.02 Prepare electrical drawings.
39.03 Prepare electrical drawings.
39.04 Prepare electromechanical drawings.

Florida Department of Education
INTENDED OUTCOMES

Program Title: Mechanical Drafting 96-97

	PSAV
Program Numbers	**I480116**
CIP Number	0648.010501
Grade Level	30, 31
Length	1800 hours
Certification	DRAFTING @7 G
Basic Skills	
Math	9
Language	9
Reading	9

INTENDED OUTCOMES: After successfully completing this program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
BLUEPRINT READER - Industry Title

01.0 Apply basic drafting skills.
02.0 Apply fundamental computer skills.
03.0 Prepare multi-view drawings.
04.0 Prepare sectional views.
05.0 Prepare auxiliary drawings.
06.0 Apply basic dimensioning.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
DRAFTING ASSISTANT - DOT Code 017.281-018

07.0 Prepare pictorial drawings.
08.0 Prepare surface developments.
09.0 Prepare basic architectural drawings.
10.0 Demonstrate an understanding of basic civil drawings.
11.0 Demonstrate basic electrical/electronic literacy.
12.0 Prepare basic computer aided drawings.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate applied math skills.
15.0 Demonstrate basic science as applied to drafting.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
DRAFTER, MECHANICAL - DOT Code 007.281-010

40.0 Prepare advanced mechanical drawings.
41.0 Prepare production drawings.
42.0 Prepare basic pneumatic/hydraulic drawings.
43.0 Prepare tool drawings.

44.0 Employ advanced computer aided drafting functions.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Mechanical Drafting
Secondary Number:
Postsecondary Number: I480116

OCCUPATIONAL COMPLETION POINT - DATA CODE A
BLUEPRINT READER - Industry Title

01.0 APPLY BASIC DRAFTING SKILLS--The student will be able to:

- 01.01 Use drafting equipment, measuring scales, drafting instruments and reproduction equipment.
- 01.02 Identify and use the various drafting media and techniques.
- 01.03 Demonstrate the use of the alphabet of lines.
- 01.04 Prepare title blocks and other drafting formats.
- 01.05 Use various freehand and other lettering techniques.
- 01.06 Prepare axonometric, oblique and perspective freehand sketches.
- 01.07 Prepare charts, graphs, and diagrams.
- 01.08 Apply geometric construction techniques.

02.0 APPLY FUNDAMENTAL COMPUTER SKILLS--The student will be able to:

- 02.01 Demonstrate care of equipment.
- 02.02 Operate a mouse, keyboard and digitizer as input devices.
- 02.03 Operate printers and plotters as output devices.
- 02.04 Demonstrate handling and operation of storage media.
- 02.05 Start and shut down a work station.
- 02.06 Adjust monitor controls for maximum comfort and usability.
- 02.07 Perform basic operating system functions.
- 02.08 Start and exit a software program as required.
- 02.09 Demonstrate file management techniques of copying and deleting.
- 02.10 Format a floppy disk.
- 02.11 Identify, create, and use directory structure and change directory paths.
- 02.12 Demonstrate file maintenance and backup procedures.
- 02.13 Save drawings to storage devices.

03.0 PREPARE MULTI-VIEW DRAWINGS--The student will be able to:

- 03.01 Prepare multi-view freehand sketches.
- 03.02 Select drawing scale, views and layout.
- 03.03 Prepare drawings containing horizontal, vertical and inclined surfaces.
- 03.04 Prepare drawings containing circles and/or arcs.
- 03.05 Prepare drawings incorporating removed details and conventional breaks.

04.0 PREPARE SECTIONAL VIEWS--The student will be able to:

- 04.01 Prepare drawings containing full sections and half sections.
- 05.02 Prepare drawings containing offset sections.
- 04.03 Prepare drawings containing revolved sections.
- 04.04 Prepare drawings containing removed sections and broken-out sections.
- 04.05 Prepare an assembly drawing applying material symbols.

05.0 PREPARE AUXILIARY DRAWINGS--The student will be able to:

- 05.01 Prepare drawings containing primary auxiliary views.
- 05.02 Prepare drawings containing auxiliary views that include curved lines.

06.0 APPLY BASIC DIMENSIONING--The student will be able to:

- 06.01 Prepare drawings containing linear, angular, and circular standard dimensions.
- 06.02 Prepare drawings using metric dimensions.
- 06.03 Prepare drawings using general and local notes.
- 06.04 Employ basic tolerancing techniques.

OCCUPATIONAL COMPLETION POINT - DATA CODE B

DRAFTING ASSISTANT - DOT Code 017.281-018

07.0 PREPARE PICTORIAL DRAWINGS--The student will be able to:

- 07.01 Prepare isometric, oblique and other pictorial drawings.
- 07.02 Prepare one- and two-point perspectives.

08.0 PREPARE SURFACE DEVELOPMENTS--The student will be able to:

- 08.01 Prepare developments of prisms, cylinders, cones and pyramids.
- 08.02 Prepare developments of a transition piece.
- 08.03 Prepare drawings involving intersecting pieces.

09.0 PREPARE BASIC ARCHITECTURAL DRAWINGS--The student will be able to:

- 09.01 Prepare site plan.
- 09.02 Prepare floor plan.
- 09.03 Prepare exterior elevations.
- 09.04 Prepare roof plan.

10.0 DEMONSTRATE AN UNDERSTANDING OF BASIC CIVIL DRAWINGS--The student will be able to:

- 10.01 Understand civil terminology.
- 10.02 Read and interpret civil drawings.
- 10.03 Prepare plan and profile drawings.
- 10.04 Develop topographic drawings.

11.0 DEMONSTRATE ELECTRICAL/ELECTRONIC LITERACY--The student will be able to:

11.01 Identify electrical/electronic symbols.
11.02 Read and interpret basic schematic diagrams.

12.0 PERFORM BASIC COMPUTER AIDED DRAFTING FUNCTIONS--The student will be able to:

12.01 Perform drawing set up.
12.02 Construct geometric figures of lines, splines, circles, and arcs.
12.03 Create and edit text using appropriate style and size to annotate drawings.
12.04 Use and control accuracy enhancement tools for entity positioning methods such as snap and XYZ.
12.05 Identify, create, store and use standard part symbols and libraries.
12.06 Utilize editing commands.
12.07 Control entity properties by layer, color and line type.
12.08 Use viewing commands to perform zooming and panning.
12.09 Plot drawings on media using layout and scale.
12.10 Minimize file size.
12.11 Use query commands to interrogate database for entity characteristics, distance, area and status.
12.12 Apply standard dimensioning rules.

13.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

13.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
13.02 Read written and follow oral instructions.
13.03 Answer and ask questions coherently and concisely.
13.04 Read critically by recognizing assumptions and implications and by evaluating ideas.
13.05 Demonstrate appropriate telephone/communication skills.
13.06 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.

14.0 DEMONSTRATE APPLIED MATH SKILLS--The student will be able to:

14.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
14.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
14.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
14.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

14.05 Demonstrate an understanding of federal, state and local taxes and their computation.
14.06 Solve arithmetic problems.
14.07 Solve algebra problems.
14.08 Solve right-angle trigonometric problems.
14.09 Solve geometry problems.
14.10 Employ multiple discipline calculations and conversion tables using fraction, decimals and metric measurements.

15.0 DEMONSTRATE BASIC SCIENCE AS APPLIED TO DRAFTING--The student will be able to:

15.01 Draw conclusions or make inferences from data.
15.02 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Prepare documents which may be required when applying for a job interview including a resume, portfolio and job application form.
16.04 Demonstrate competence in job interview techniques.
16.05 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
16.06 Identify acceptable work habits.
16.07 Demonstrate knowledge of how to make job changes appropriately.
16.08 Demonstrate acceptable employee health habits.
16.09 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.
16.10 Identify or demonstrate acceptable personal grooming habits.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define entrepreneurship.
17.02 Describe the importance of entrepreneurship to the American economy.
17.03 List the advantages and disadvantages of business ownership.
17.04 Identify the risks involved in ownership of a business.
17.05 Identify the necessary personal characteristics of a successful entrepreneur.
17.06 Identify the business skills needed to operate a small business efficiently and effectively.
17.07 Identify basic occupational licensing and insurance.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
DRAFTER, MECHANICAL - DOT Code 007.281-010

40.0 PREPARE ADVANCED MECHANICAL DRAWINGS--The student will be able to.

40.01 Resolve problems by descriptive geometry and revolutions.
40.02 Prepare advance surface drawings.
40.03 Identify the various manufacturing methods.
40.04 Use precision dimensioning to include geometric characters.
40.05 Make engineering changes on drawings.
40.06 Prepare fastener drawings.
40.07 Prepare cam calculations and drawings.
40.08 Prepare gear calculations.
40.09 Prepare spring calculations and drawings.

41.0 PREPARE PRODUCTION DRAWINGS--The student will be able to.

41.01 Make a design layout drawing.
41.02 Make detail drawings.
41.03 Make pattern shop detail drawings.
41.04 Make casting drawings.
41.05 Make forging detail drawings.
41.06 Make machining detail drawings.
41.07 Make stamping drawings.
41.08 Make welding drawings.
41.09 Make assembly drawings.
41.10 Prepare installation drawings.

42.0 PREPARE PNEUMATIC/HYDRAULIC DRAWINGS--The student will be able to.

42.01 Prepare piping drawings.
42.02 Prepare pictorial drawings.
42.03 Prepare sectional drawings.
42.04 Prepare diagrams.

43.0 PREPARE TOOL DRAWINGS--The student will be able to.

43.01 Design jigs and fixtures.
43.02 Design cutting dies.
43.03 Design forming dies.

44.0 PREPARE ADVANCED COMPUTER AIDED DRAWINGS--The student will be able to.

44.01 Prepare advanced mechanical drawings.
44.02 Prepare production drawings.
44.03 Prepare tool drawings.
44.04 Prepare pneumatic/hydraulic drawings.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Drafting and Design Technology
Occupational Area:	Industrial
	PSV
CIP Number	0615.020200
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as drafters (22514230), chief design drafters (017.161-010), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, drafting standards, math skills and drafting office practices to assist mathematical, electrical and electronic, architectural, chemical, civil, or other engineers in the design and drafting of electrical circuits, machines, structures, weldments or architectural plans. Includes instruction in the preparation of engineering plans, layouts and detailed drawings according to conventional projection principles, preparation of charts, graphs or diagrams, and the use of handbook data germane to design and drafting in various fields.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Drafting and Design industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in drafting with the tools, materials, technical data, calculators and blueprint machines used in the laboratory similar to those used in industry.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-

job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Apply basic drafting skills.
02.0 Prepare mechanical drawings.
03.0 Prepare electrical/electronic drawings.
04.0 Prepare pneumatic/hydraulic drawings.
05.0 Prepare charts and graphs.
06.0 Apply technical mathematics.
07.0 Prepare architectural drawings.
08.0 Prepare computer aided drawings.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate appropriate math skills.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate employability skills.
13.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Drafting And Design Technology
Secondary Number:
Postsecondary Number: 0615.020200

01.0 APPLY BASIC DRAFTING SKILLS--The student will be able to:

01.01 Apply safety practices.
01.02 Operate drafting instruments.
01.03 Perform lettering techniques.
01.04 Prepare multi-view drawings.
01.05 Prepare sectional views.
01.06 Prepare auxiliary views.
01.07 Prepare dimension drawings.
01.08 Prepare pictorial drawings.
01.09 Prepare sketches.
01.10 Prepare title blocks and other formats.
01.11 Apply systems drafting techniques.
01.12 Compile a portfolio.

02.0 PREPARE MECHANICAL DRAWINGS--The student will be able to:

02.01 Prepare fastener drawings.
02.02 Prepare cam drawings.
02.03 Prepare gear drawings.
02.04 Prepare assembly drawings.
02.05 Prepare detail drawings.
02.06 Prepare surface developments.
02.07 Prepare technical drawings.
02.08 Prepare welding drawings.
02.09 Prepare bearing drawings.
02.10 Prepare spring drawings.
02.11 Prepare casting drawings.
02.12 Prepare forging drawings.
02.13 Prepare tool drawings.
02.14 Prepare molding diagrams.
02.15 Prepare drawings with special processed holes.
02.16 Prepare stamping drawings.
02.17 Prepare numerical control drawings.
02.18 Prepare computer aided drawings.

03.0 PREPARE ELECTRICAL/ELECTRONIC DRAWINGS--The student will be able to:

03.01 Prepare schematic drawings.
03.02 Prepare printed circuit board drawings.
03.03 Prepare package drawings.
03.04 Prepare connection drawings.
03.05 Prepare interconnection drawings.
03.06 Prepare cable drawings.
03.07 Prepare cable drawings.
03.08 Prepare harness drawings.

03.09 Prepare component drawings.
03.10 Prepare logic diagrams.

04.0 PREPARE PNEUMATIC/HYDRAULIC DRAWINGS--The student will be able to:

04.01 Prepare piping drawings.
04.02 Prepare pump and motor drawings.
04.03 Prepare cylinder and piston diagrams.
04.04 Prepare valve drawings.
04.05 Prepare pump section drawings.
04.06 Prepare pulley and chain drive drawings.

05.0 PREPARE CHARTS AND GRAPHS--The student will be able to:

05.01 Prepare charts.
05.02 Prepare graphs.

06.0 APPLY TECHNICAL MATHEMATICS--The student will be able to:

06.01 Solve arithmetic problems.
06.02 Solve algebra problems.
06.03 Solve trigonometry problems.
06.04 Solve geometry problems.
06.05 Solve surveying problems.

07.0 PREPARE ARCHITECTURAL DRAWINGS--The student will be able to:

07.01 Prepare floor plan drawings.
07.02 Prepare foundation plan and detail drawings.
07.03 Prepare elevation drawings.
07.04 Prepare landscape layouts.
07.05 Prepare schedules.
07.06 Prepare sections.
07.07 Build architectural models.
07.08 Prepare truss drawings.
07.09 Prepare stairway drawings.
07.10 Prepare fireplace drawings.
07.11 Prepare plot plan drawings.
07.12 Prepare plumbing plan drawings.
07.13 Prepare climate control drawings.
07.14 Prepare electrical plan drawings.

08.0 PREPARE COMPUTER AIDED DRAWINGS--The student will be able to:

08.01 Operate work terminal.
08.02 Utilize system commands.
08.03 Perform drafting procedures.
08.04 Operate peripheral equipment.
08.05 Apply specialized CAD functions.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.

09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.

09.03 Read and follow written and oral instructions.

09.04 Answer and ask questions coherently and concisely.

09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.

09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

11.02 Draw conclusions or make inferences from data.

11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.

12.02 Secure information about a job.

12.03 Identify documents which may be required when applying for a job interview.

12.04 Complete a job application form correctly.

12.05 Demonstrate competence in job interview techniques.

12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

12.07 Identify acceptable work habits.

12.08 Demonstrate knowledge of how to make job changes appropriately.

12.09 Demonstrate acceptable employee health habits.

12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.
13.05 Identify the necessary personal characteristics of a successful entrepreneur.
13.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Dry Cleaning and Laundering
Occupational Area: Industrial Education

	Secondary	PSAV
Program Numbers	**8733000**	**I120101**
CIP Number	0612.010100	0612.010100
Grade Level	9-12, 30, 31	30, 31
Length	3 credits	450 hours
Certification	DRY CLEAN @7 G FAB MAINT @7 G	DRY CLEAN @7 G FAB MAINT @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as laundry, drycleaning machine operators (92726885), spotters (362.381-010), drycleaners (362.382-014), leather cleaners (362.684-026), all-around pressers (363.682-014) and hand pressers (363.684-018).

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and skills needed to operate and manage dry cleaning plants including receiving, cleaning, repairing and returning garments to customers.

Listed below are the courses that comprise this program when offered at the secondary level:

8733010 - Dry Cleaning and Laundering 1
8733020 - Dry Cleaning and Laundering 2
8733030 - Dry Cleaning and Laundering 3

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Dry Cleaning and Laundering industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in hands-on experiences with chemicals, implements and equipment appropriate to the program content and in accordance with current practices in the trade. Strong emphasis is placed on stain identification, stain removal, chemical safety and cleaning and finishing garments.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 8.0, Language 8.0, Reading 7.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

When this program is offered at the postsecondary level it may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 450 hours. Students may concentrate in the areas of pressing/finishing by completing outcomes 1 and 16-31, or as a spotter cleaner by completing outcomes 1-15 and 29-30.

The particular outcomes and student performance standards which the handicapped student must master to earn credit must be specified in the student's individual educational plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate understanding of procedures of orientation and safety.
02.0 Use and maintain spotting equipment and tools.
03.0 Identify fibers and fabrics.
04.0 Identify and test fabric and dyestuffs.
05.0 Demonstrate understanding of chemicals and formulas.
06.0 Identify stains.
07.0 Remove stains.
08.0 Explain properties and uses of petroleum and synthetic solvents.
09.0 Operate synthetic washer-extractors.
10.0 Operate reclaiming tumblers.
11.0 Operate filters.

12.0 Demonstrate troubleshooting skills.
13.0 Understand proper operation of stills.
14.0 Operate pumps at maximum efficiency.
15.0 Clean garments.
16.0 Adjust and operate utility pressers.
17.0 Adjust and operate mushroom and automatic pants topper.
18.0 Adjust and operate automatic leggers.
19.0 Operate form finishers.
20.0 Finish slacks and shirts.
21.0 Finish coats.
22.0 Finish trousers.
23.0 Finish dresses.
24.0 Finish children's garments.
25.0 Finish pleats and knitted garments.
26.0 Finish silk.
27.0 Inspect garments.
28.0 Perform routine maintenance.
29.0 Demonstrate employability skills.
30.0 Demonstrate an understanding of entrepreneurship.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Drycleaning And Laundering
Secondary Number: 8733000
Postsecondary Number: I120101

01.0 DEMONSTRATE UNDERSTANDING OF PROCEDURES OF ORIENTATION AND SAFETY--The student will be able to:

- 01.01 Define objectives of the course.
- 01.02 Explain safety procedures.
- 01.03 Explain school/class procedures.
- 01.04 Explain the control limitations.
- 01.05 Exhibit the ability to check the basket for burrs and pins.
- 01.06 Demonstrate the ability to adjust the loading doors.
- 01.07 Define faulty pump.

02.0 USE AND MAINTAIN SPOTTING EQUIPMENT AND TOOLS--The student will be able to:

- 02.01 Identify the spotter's equipment and tools.
- 02.02 Utilize the spotter's equipment and tools.
- 02.03 Write a list of equipment and tools.

03.0 IDENTIFY FIBERS AND FABRICS--The student will be able to:

- 03.01 Identify fibers and fabrics.
- 03.02 Explain methods of fabric construction.
- 03.03 Define the characteristics of fibers.
- 03.04 Demonstrate burning tests for fiber content.

04.0 IDENTIFY AND TEST FABRICS AND DYESTUFFS--The student will be able to:

- 04.01 Identify dyestuffs.
- 04.02 Define the composition of dyestuffs.
- 04.03 Determine proper cleaning procedure for fabrics and dyes.

05.0 DEMONSTRATE UNDERSTANDING OF CHEMICALS AND FORMULAS--The student will be able to:

- 05.01 Define the chemical properties of a formula and its effect on fabrics.
- 05.02 Write a list of formulas used in spotting.
- 05.03 Write a list of spotting agents.

06.0 IDENTIFY STAINS--The student will be able to:

- 06.01 Define methods of stain identification.
- 06.02 Write various methods of stain identification.

07.0 REMOVE STAINS--The student will be able to:

07.01 Identify a stain.
07.02 Demonstrate methods for removing stains.

08.0 EXPLAIN PROPERTIES AND USES OF PETROLEUM AND SYNTHETIC SOLVENTS--The student will be able to:

08.01 Write a brief history on the development of petroleum solvent.
08.02 Write methods for refining petroleum solvents.
08.03 Write specifications for petroleum solvent.
08.04 Write the properties of synthetic solvent.
08.05 Write the methods for making synthetic solvent.

09.0 OPERATE SYNTHETIC WASHER-EXTRACTORS--The student will be able to:

09.01 Demonstrate the ability to set controls on the machine.
09.02 Demonstrate the ability to load the machine with solvent.
09.03 Demonstrate the ability to operate a machine manually.

10.0 OPERATE RECLAIMING TUMBLERS--The student will be able to:

10.01 Exhibit the ability to operate a tumbler.
10.02 Demonstrate the ability to control the temperature on a tumbler.
10.03 Exhibit the ability to operate a drying cabinet.

11.0 OPERATE FILTERS--The student will be able to:

11.01 Exhibit the ability to operate filters.
11.02 Explain the operation of cookers and stills.
11.03 Explain filter maintenance methods.

12.0 DEMONSTRATE TROUBLESHOOTING SKILLS--The student will be able to:

12.01 Explain the use of the filter pressure gauge.
12.02 Explain plugged screens, tubes or bags.
12.03 Exhibit the ability to steam clean and boil screens, tubes, or cleaning bags.
12.04 Describe in writing the distilling solvent.
12.05 Exhibit the ability to operate the pump on a filter.

13.0 UNDERSTAND PROPER OPERATION OF STILLS--The student will be able to:

13.01 Explain the causes for slow down in distilling solvent.
13.02 List factors of a worn out pump.
13.03 Explain vacuum leak.
13.04 Explain a steam or water leak.
13.05 Define vacuum still pressure.
13.06 Explain how to clean dirty heating tubes.
13.07 Determine a faulty steam trap.
13.08 Diagnose an odor in a distilled solvent.

14.0 OPERATE PUMPS AT MAXIMUM EFFICIENCY--The student will be able to:

14.01 Demonstrate the reducing or no flow of solvent.

14.02 Define the loss of pump prime.
14.03 Identify position of the valve in either a suction or discharge line.
14.04 Determine the clogged strainers in suction lines.
14.05 Determine the solvent level in tanks below the pump lines.
14.06 Explain a slipping pump drive belt.
14.07 Explain a pressure relief valve, open on gear pumps.
14.08 Explains lint build up on the impeller in the pump.

15.0 CLEAN GARMENTS--The student will be able to:

15.01 Demonstrate understanding of causes for excessive redeposit.
15.02 Explain insufficient filter flow rate.
15.03 Define improper garment classification.
15.04 Explain dissolved garment classification.
15.05 Define causes for excessive oils or greases in solvents.
15.06 Write causes for wrinkles occurring in drycleaning.
15.07 Diagnose causes for garment streaks, slow drying, or spotting rings.
15.08 Determine the reason for objectionable odors.
15.09 Define bleeding of dyes.
15.10 Describe dye or soil pick-up in local areas.
15.11 Explain restoration procedures of insoluble soil.
15.12 Demonstrate the method for softening plastic-coated fabrics.

16.0 ADJUST AND OPERATE UTILITY PRESSERS--The student will be able to:

16.01 Write specifications for the utility press.
16.02 Demonstrate ability to operate the utility press.
16.03 Perform maintenance procedure.
16.04 Demonstrate variable pressure operation.
16.05 Demonstrate the iron attachment.

17.0 ADJUST AND OPERATE MUSHROOM AND AUTOMATIC PANTS TOPPER--The student will be able to:

17.01 State specifications for the topper press.
17.02 Demonstrate the operation of the pants topper.
17.03 Explain the timer on an automatic topper press.
17.04 Demonstrate programmer adjustment procedures on the topper.

18.0 ADJUST AND OPERATE AUTOMATIC LEGGERS--The student will be able to:

18.01 State specifications for the automatic legger.
18.02 Demonstrate the operation of the legger.
18.03 Define the timer on the legger.
18.04 Demonstrate the mechanical adjustment of the legger.

19.0 OPERATE FORM FINISHERS--The student will be able to:

19.01 List specifications for the form finisher.
19.02 Exhibit steps for the timer on a form finisher.
19.03 Demonstrate the operation of the form finisher.
19.04 Perform the steps for finishing a coat.

19.05 Perform the steps for finishing a dress.

20.0 FINISH SLACKS AND SKIRTS--The student will be able to:

20.01 Demonstrate steps necessary to place back, left hip of slacks on mushroom press.
20.02 Describe steps necessary to place back, right hip of slacks on mushroom press.
20.03 Demonstrate steps necessary to place front, right hip of slacks on press.
20.04 Demonstrate steps necessary to place front, left hip of slacks on press.
20.05 State the methods of legging slacks on regular press.
20.06 Demonstrate the methods necessary when finishing skirts.

21.0 FINISH COATS--The student will be able to:

21.01 Exhibit procedures for finishing coats on a form finisher and utility press.
21.02 Demonstrate steps in finishing sleeves on coats.
21.03 Exhibit methods of finishing coat collars.
21.04 Demonstrate steps in finishing the front left shoulder and sleeve head.
21.05 Exhibit steps in finishing front lay.
21.06 Demonstrate methods of finishing lapels.
21.07 Demonstrate steps in finishing linings.

22.0 FINISH TROUSERS--The student will be able to:

22.01 Demonstrate procedures in topping trousers on upright presser.
22.02 Demonstrate steps in finishing trouser tops or waistbands.
22.03 Demonstrate steps in finishing pockets on trousers.
22.04 Demonstrate steps in finishing left legs of trousers.
22.05 Demonstrate steps in finishing right legs of trousers.

23.0 FINISH DRESSES--The student will be able to:

23.01 Demonstrate operations for finishing sleeves on dresses.
23.02 Demonstrate steps in finishing collars and lapels on dresses.
23.03 Demonstrate process of finishing blouses.
23.04 Demonstrate steps for finishing skirts or dresses.

24.0 FINISH CHILDREN'S GARMENTS--The student will be able to:

24.01 Demonstrate methods of finishing a sleeve on a child's coat.
24.02 Demonstrate steps in finishing collars and trim.
24.03 Demonstrate steps in finishing fronts and backs of coats.
24.04 Demonstrate methods of finishing trousers.
24.05 Exhibit techniques for finishing boys' and girls' jackets.

25.0 FINISH PLEATS AND KNITTED GARMENTS--The student will be able to:

25.01 Demonstrate steps for finishing pleats.

25.02 Demonstrate procedures for finishing pleats on the sleeve board.
25.03 Demonstrate methods for finishing pleats on the utility press.
25.04 Demonstrate methods for finishing knitted garments.
25.05 Perform methods for measuring knitted garments before and after finishing.
25.06 List methods of handling finished knitted garments.

26.0 FINISH SILK--The student will be able to:

26.01 Finish sleeves on the sleeve puff iron.
26.02 Finish a skirt on the long press.
26.03 Finish collars and lapels.
26.04 Finish collars and lapels.
26.05 Demonstrate steps in touch-up of finished garments.

27.0 INSPECT GARMENTS--The student will be able to:

27.01 Demonstrate methods of inspection.
27.02 Define points of inspection in the order in which work has processed through various departments.
27.03 State processes for inspecting garments which need special attention.

28.0 ROUTINE MAINTENANCE--The student will be able to:

28.01 Determine causes of machine malfunction.
28.02 Perform preventative maintenance.
28.03 Perform shop housekeeping duties.
28.04 Explain and demonstrate proper handling and storage of flammable and/or toxic materials.

29.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

29.01 Conduct a job search.
29.02 Secure information about a job.
29.03 Identify documents required when applying for a job interview.
29.04 Complete a job application form correctly.
29.05 Demonstrate competence in job interview techniques.
29.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
29.07 Demonstrate acceptable work habits.
29.08 Demonstrate knowledge of how to make appropriate job changes.
29.09 Demonstrate acceptable employee health habits.
29.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

30.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

30.01 Define entrepreneurship.
30.02 Describe the importance of entrepreneurship to the American economy.
30.03 List advantages and disadvantages of business ownership.

30.04 Identify risks involved in ownership of a business.
30.05 Identify personal characteristics of a successful entrepreneur.
30.06 Identify business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8733010
Course Title: Dry Cleaning and Laundering 1
Course Credit: 1

COURSE DESCRIPTION:

This course will include orientation on safety, spotting, stain removal and employability skills.

01.0 DEMONSTRATE UNDERSTANDING OF PROCEDURES OF ORIENTATION AND SAFETY--The student will be able to:

- 01.01 Define objectives of the course.
- 01.02 Explain safety procedures.
- 01.03 Explain school/class procedures.
- 01.04 Explain the control limitations.
- 01.05 Exhibit the ability to check the basket for burrs and pins.
- 01.06 Demonstrate the ability to adjust the loading doors.
- 01.07 Define faulty pump.

02.0 USE AND MAINTAIN SPOTTING EQUIPMENT AND TOOLS--The student will be able to:

- 02.01 Identify the spotter's equipment and tools.
- 02.02 Utilize the spotter's equipment and tools.
- 02.03 Write a list of equipment and tools.

03.0 IDENTIFY FIBERS AND FABRICS--The student will be able to:

- 03.01 Identify fibers and fabrics.
- 03.02 Explain methods of fabric construction.
- 03.03 Define the characteristics of fibers.
- 03.04 Demonstrate burning tests for fiber content.

04.0 IDENTIFY AND TEST FABRICS AND DYESTUFFS--The student will be able to:

- 04.01 Identify dyestuffs.
- 04.02 Define the composition of dyestuffs.
- 04.03 Determine proper cleaning procedure for fabrics and dyes.

05.0 DEMONSTRATE UNDERSTANDING OF CHEMICALS AND FORMULAS--The student will be able to:

- 05.01 Define the chemical properties of a formula and its effect on fabrics.
- 05.02 Write a list of formulas used in spotting.
- 05.03 Write a list of spotting agents.

06.0 IDENTIFY STAINS--The student will be able to:

06.01 Define methods of stain identification.
06.02 Write various methods of stain identification.

07.0 REMOVE STAINS--The student will be able to:

07.01 Identify a stain.
07.02 Demonstrate methods for removing stains.

08.0 EXPLAIN PROPERTIES AND USES OF PETROLEUM AND SYNTHETIC SOLVENTS--The student will be able to:

08.01 Write a brief history on the development of petroleum solvent.
08.02 Write methods for refining petroleum solvents.
08.03 Write specifications for petroleum solvent.
08.04 Write the properties of synthetic solvent.
08.05 Write the methods for making synthetic solvent.

29.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

29.01 Conduct a job search.
29.02 Secure information about a job.
29.03 Identify documents required when applying for a job interview.
29.04 Complete a job application form correctly.
29.05 Demonstrate competence in job interview techniques.
29.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
29.07 Demonstrate acceptable work habits.
29.08 Demonstrate knowledge of how to make appropriate job changes.
29.09 Demonstrate acceptable employee health habits.
29.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

30.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

30.01 Define entrepreneurship.
30.02 Describe the importance of entrepreneurship to the American economy.
30.03 List advantages and disadvantages of business ownership.
30.04 Identify risks involved in ownership of a business.
30.05 Identify personal characteristics of a successful entrepreneur.
30.06 Identify business skills needed to operate a small business efficiently and effectively.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8733020
Course Title: Dry Cleaning and Laundering 2
Course Credit: 1

COURSE DESCRIPTION:

This course provides instruction and shop/lab experience in operation of dry cleaning and laundry machines.

01.0 DEMONSTRATE UNDERSTANDING OF PROCEDURES OF ORIENTATION AND SAFETY--The student will be able to:

- 01.01 Define objectives of the course.
- 01.02 Explain safety procedures.
- 01.03 Explain school/class procedures.
- 01.04 Explain the control limitations.
- 01.05 Exhibit the ability to check the basket for burrs and pins.
- 01.06 Demonstrate the ability to adjust the loading doors.
- 01.07 Define faulty pump.

09.0 OPERATE SYNTHETIC WASHER-EXTRACTORS--The student will be able to:

- 09.01 Demonstrate the ability to set controls on the machine.
- 09.02 Demonstrate the ability to load the machine with solvent.
- 09.03 Demonstrate the ability to operate a machine manually.

10.0 OPERATE RECLAIMING TUMBLERS--The student will be able to:

- 10.01 Exhibit the ability to operate a tumbler.
- 10.02 Demonstrate the ability to control the temperature on a tumbler.
- 10.03 Exhibit the ability to operate a drying cabinet.

11.0 OPERATE FILTERS--The student will be able to:

- 11.01 Exhibit the ability to operate filters.
- 11.02 Explain the operation of cookers and stills.
- 11.03 Explain filter maintenance methods.

12.0 DEMONSTRATE TROUBLESHOOTING SKILLS--The student will be able to:

- 12.01 Explain the use of the filter pressure gauge.
- 12.02 Explain plugged screens, tubes or bags.
- 12.03 Exhibit the ability to steam clean and boil screens, tubes, or cleaning bags.
- 12.04 Describe in writing the distilling solvent.
- 12.05 Exhibit the ability to operate the pump on a filter.

13.0 UNDERSTAND PROPER OPERATION OF STILLS--The student will be able to:

13.01 Explain the causes for slow down in distilling solvent.
13.02 List factors of a worn out pump.
13.03 Explain vacuum leak.
13.04 Explain a steam or water leak.
13.05 Define vacuum still pressure.
13.06 Explain how to clean dirty heating tubes.
13.07 Determine a faulty steam trap.
13.08 Diagnose an odor in a distilled solvent.

14.0 OPERATE PUMPS AT MAXIMUM EFFICIENCY--The student will be able to:

14.01 Demonstrate the reducing or no flow of solvent.
14.02 Define the loss of pump prime.
14.03 Identify position of the valve in either a suction or discharge line.
14.04 Determine the clogged strainers in suction lines.
14.05 Determine the solvent level in tanks below the pump lines.
14.06 Explain a slipping pump drive belt.
14.07 Explain a pressure relief valve, open on gear pumps.
14.08 Explains lint build up on the impeller in the pump.

15.0 CLEAN GARMENTS--The student will be able to:

15.01 Demonstrate understanding of causes for excessive redeposit.
15.02 Explain insufficient filter flow rate.
15.03 Define improper garment classification.
15.04 Explain dissolved garment classification.
15.05 Define causes for excessive oils or greases in solvents.
15.06 Write causes for wrinkles occurring in drycleaning.
15.07 Diagnose causes for garment streaks, slow drying, or spotting rings.
15.08 Determine the reason for objectionable odors.
15.09 Define bleeding of dyes.
15.10 Describe dye or soil pick-up in local areas.
15.11 Explain restoration procedures of insoluble soil.
15.12 Demonstrate the method for softening plastic-coated fabrics.

28.0 ROUTINE MAINTENANCE--The student will be able to:

28.01 Determine causes of machine malfunction.
28.02 Perform preventative maintenance.
28.03 Perform shop housekeeping duties.
28.04 Explain and demonstrate proper handling and storage of flammable and/or toxic materials.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8733030
Course Title: Dry Cleaning and Laundering 3
Course Credit: 1

COURSE DESCRIPTION:

This course will provide instruction and shop/lab experience in operation of pressing and finishing machines.

01.0 DEMONSTRATE UNDERSTANDING OF PROCEDURES OF ORIENTATION AND SAFETY--The student will be able to:

- 01.01 Define objectives of the course.
- 01.02 Explain safety procedures.
- 01.03 Explain school/class procedures.
- 01.04 Explain the control limitations.
- 01.05 Exhibit the ability to check the basket for burrs and pins.
- 01.06 Demonstrate the ability to adjust the loading doors.
- 01.07 Define faulty pump.

16.0 ADJUST AND OPERATE UTILITY PRESSERS--The student will be able to:

- 16.01 Write specifications for the utility press.
- 16.02 Demonstrate ability to operate the utility press.
- 16.03 Perform maintenance procedure.
- 16.04 Demonstrate variable pressure operation.
- 16.05 Demonstrate the iron attachment.

17.0 ADJUST AND OPERATE MUSHROOM AND AUTOMATIC PANTS TOPPER--The student will be able to:

- 17.01 State specifications for the topper press.
- 17.02 Demonstrate the operation of the pants topper.
- 17.03 Explain the timer on an automatic topper press.
- 17.04 Demonstrate programmer adjustment procedures on the topper.

18.0 ADJUST AND OPERATE AUTOMATIC LEGGERS--The student will be able to:

- 18.01 State specifications for the automatic legger.
- 18.02 Demonstrate the operation of the legger.
- 18.03 Define the timer on the legger.
- 18.04 Demonstrate the mechanical adjustment of the legger.

19.0 OPERATE FORM FINISHERS--The student will be able to:

- 19.01 List specifications for the form finisher.
- 19.02 Exhibit steps for the timer on a form finisher.

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19.03 Demonstrate the operation of the form finisher.
19.04 Perform the steps for finishing a coat.
19.05 Perform the steps for finishing a dress.

20.0 FINISH SLACKS AND SKIRTS--The student will be able to:

20.01 Demonstrate steps necessary to place back, left hip of slacks on mushroom press.
20.02 Describe steps necessary to place back, right hip of slacks on mushroom press.
20.03 Demonstrate steps necessary to place front, right hip of slacks on press.
20.04 Demonstrate steps necessary to place front, left hip of slacks on press.
20.05 State the methods of legging slacks on regular press.
20.06 Demonstrate the methods necessary when finishing skirts.

21.0 FINISH COATS--The student will be able to:

21.01 Exhibit procedures for finishing coats on a form finisher and utility press.
21.02 Demonstrate steps in finishing sleeves on coats.
21.03 Exhibit methods of finishing coat collars.
21.04 Demonstrate steps in finishing the front left shoulder and sleeve head.
21.05 Exhibit steps in finishing front lay.
21.06 Demonstrate methods of finishing lapels.
21.07 Demonstrate steps in finishing linings.

22.0 FINISH TROUSERS--The student will be able to:

22.01 Demonstrate procedures in topping trousers on upright presser.
22.02 Demonstrate steps in finishing trouser tops or waistbands.
22.03 Demonstrate steps in finishing pockets on trousers.
22.04 Demonstrate steps in finishing left legs of trousers.
22.05 Demonstrate steps in finishing right legs of trousers.

23.0 FINISH DRESSES--The student will be able to:

23.01 Demonstrate operations for finishing sleeves on dresses.
23.02 Demonstrate steps in finishing collars and lapels on dresses.
23.03 Demonstrate process of finishing blouses.
23.04 Demonstrate steps for finishing skirts or dresses.

24.0 FINISH CHILDREN'S GARMENTS--The student will be able to:

24.01 Demonstrate methods of finishing a sleeve on a child's coat.
24.02 Demonstrate steps in finishing collars and trim.
24.03 Demonstrate steps in finishing fronts and backs of coats.
24.04 Demonstrate methods of finishing trousers.

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24.05 Exhibit techniques for finishing boys' and girls' jackets.

25.0 FINISH PLEATS AND KNITTED GARMENTS--The student will be able to:

25.01 Demonstrate steps for finishing pleats.
25.02 Demonstrate procedures for finishing pleats on the sleeve board.
25.03 Demonstrate methods for finishing pleats on the utility press.
25.04 Demonstrate methods for finishing knitted garments.
25.05 Perform methods for measuring knitted garments before and after finishing.
25.06 List methods of handling finished knitted garments.

26.0 FINISH SILK--The student will be able to:

26.01 Finish sleeves on the sleeve puff iron.
26.02 Finish a skirt on the long press.
26.03 Finish collars and lapels.
26.04 Finish collars and lapels.
26.05 Demonstrate steps in touch-up of finished garments.

27.0 INSPECT GARMENTS--The student will be able to:

27.01 Demonstrate methods of inspection.
27.02 Define points of inspection in the order in which work has processed through various departments.
27.03 State processes for inspecting garments which need special attention.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Drywall Installation
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I460404**
CIP Number	0646.040400
Grade Level	30, 31
Length	600 hours
Certification	TEC CONSTR ¶7 ¶G
	BLDG CONST ¶7 ¶G
	DRYWALL @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as drywall installers (87108555), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, use of ladders and scaffolds, materials, and tools, to install wallboard, plasterboard or other interior surfaces in structures.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Drywall industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in the installation and finishing of drywall materials.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational student organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6a-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 7.0, Language 7.0, Reading 8.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 600 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Read and interpret blueprints and schematics.
02.0 Perform material and cost estimations.
03.0 Select, use and maintain tools and equipment.
04.0 Erect and use scaffolds, ladders, and stilts.
05.0 Install drywall on wood and metal framing.
06.0 Tape, compound, and finish drywall.
07.0 Demonstrate appropriate communication skills.
08.0 Demonstrate appropriate math skills.
09.0 Demonstrate appropriate understanding of basic science.
10.0 Demonstrate employability skills.
11.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Dry Wall Installation
Secondary Number:
Postsecondary Number: I460404

01.0 READ AND INTERPRET BLUEPRINTS AND SCHEMATICS--The student will be able to:

- 01.01 Apply math skills.
- 01.02 Read scales and measuring instruments.
- 01.03 Read and interpret types of dimensions.
- 01.04 Read and interpret pictorial drawings.
- 01.05 Read and interpret supplemental information.
- 01.06 Read and interpret floor plan drawings.
- 01.07 Read and interpret schedules.
- 01.08 Read and interpret roof-framing and ceiling plans.
- 01.09 Read and interpret specifications.
- 01.10 Read and interpret detail drawings and sketches.
- 01.11 Read, interpret and use symbols and abbreviations.
- 01.12 Prepare and use freehand sketches.
- 01.13 Prepare and use vertical, horizontal and overhead panel arrangements.

02.0 PERFORM MATERIAL AND COST ESTIMATIONS--The student will be able to:

- 02.01 Compile a list of supplies and materials from working drawings, written instructions or verbal instruction.
- 02.02 Compile labor costs.
- 02.03 Compile equipment cost, to include renting, purchasing, leasing and maintenance.
- 02.04 Compile overhead costs.

03.0 SELECT, USE AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:

- 03.01 Demonstrate knowledge of safety skills, first aid, OSHA, Workers Compensation Law, workers liability and responsibility on the job site.
- 03.02 Apply safety rules and procedures at the job site and training site.
- 03.03 Demonstrate safety devices, equipment and the application of first aid techniques.
- 03.04 Demonstrate the safe transportation, maintenance and storage of tools and equipment.
- 03.05 Demonstrate safe use of hand tools, reciprocating saw, saber saw, drywall nailer, electric drill with depth adjusting clutch, mechanical taping tool, spray gun, finisher, adjustable stilts, automatic tape "banjo", portable power saw, ladders, scaffolds and power mixers.

04.0 ERECT AND USE SCAFFOLDS, LADDERS AND STILTS--The student will be able to:

- 04.01 Transport, assemble, use, disassemble and store scaffolding in accordance with industry practices and OSHA standards for wooden pole, tube and clamp, tubular welded frame and mobile categories.
- 04.02 Transport, set, adjust, use and store portable straight ladders and extension ladders including extensions.
- 04.03 Assemble, adjust, maintain and use adjustable stilts.

05.0 INSTALL DRYWALL ON WOOD AND METAL FRAMING--The student will be able to:

- 05.01 Select appropriate drywall materials according to type, thickness and edges requirements.
- 05.02 Measure and cut wallboard, including inside cuts, curves and irregular shapes.
- 05.03 Select and use appropriate fasteners or adhesives to mount wallboard to wooden framing, metal framing, new work or old work.
- 05.04 Fasten several types of metal corner beads and channel trim on edges and openings.
- 05.05 Apply single layer and double layer construction (two-ply) over wood framing.

06.0 TAPE, COMPOUND AND FINISH DRYWALL--The student will be able to:

- 06.01 Apply joint compound and reinforcing tape.
- 06.02 Apply pressure sensitive glass-fiber tape and compound.
- 06.03 Finish wallboard to receive other coverings.

07.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 07.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 07.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 07.03 Read and follow written and oral instructions.
- 07.04 Answer and ask questions coherently and concisely.
- 07.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 07.06 Demonstrate appropriate telephone/communication skills.

08.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 08.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 08.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 08.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

08.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
08.05 Demonstrate an understanding of federal, state and local taxes and their computation.

09.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

09.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
09.02 Draw conclusions or make inferences from data.
09.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
09.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

10.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

10.01 Conduct a job search.
10.02 Secure information about a job.
10.03 Identify documents which may be required when applying for a job interview.
10.04 Complete a job application form correctly.
10.05 Demonstrate competence in job interview techniques.
10.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
10.07 Identify acceptable work habits.
10.08 Demonstrate knowledge of how to make job changes appropriately.
10.09 Demonstrate acceptable employee health habits.
10.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

11.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

11.01 Define entrepreneurship.
11.02 Describe the importance of entrepreneurship to the American economy.
11.03 List the advantages and disadvantages of business ownership.
11.04 Identify the risks involved in ownership of a business.
11.05 Identify the necessary personal characteristics of a successful entrepreneur.
11.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Electric Line Service And Repair
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	N/A
	PSAV
Program Numbers	**I460303**
CIP Number	0646.030300
Grade Level	30, 31
Length	600 Hours
Certification	ELECTRICAL @7 G
	TEC ELEC @7 G
Facility Code	245
VSO	VICA
Coop Method	Yes
Apprenticeship	Yes
Basic Skills	
Math	8
Language	8
Reading	8

I. **PURPOSE**: The purpose of this program is to prepare students for employment as electrical powerline installer OES 85723615, or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, installation, operation, and maintenance of local, long distance, and rural power lines; erection and construction of pole and tower lines; and installation of underground lines.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Electric Line Service and Repair industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program and provide instruction in the construction of utility power transmission lines and equipment used to conduct electrical energy between generating stations, substations, and consumers. All phases of overhead and underground power line installation is covered.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc. is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational student organizations, when provided, shall be an integral part of the

vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

Planned and supervised instructional activities must be provided through one or more of the following: (1)directed laboratory experience (2) student projects (3)placement for experience (4)cooperative experience.

The cooperative method of (OJT) may be utiliized for this program. Whenever the cooperative method is offered, the following is required for each student: (1) A training plan signed by the student, teacher and employer that includes instructional objectives and a list of on-the-job and in-school learning experiences; and (2) A work station that reflects equipment, skills and tasks that are relevant to the occupations that the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade levels required for this postsecondary adult vocational program is: Mathematics 8.0, Language 8.0, Reading 8.0, in order for students to exit the program or the occupational completion points within the program. These grade level numbers correspond to a grade equivalent score obtained on one of the state designated basic skills examinations. If a student does not meet the basic skills level required for completion from the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) laboratory or prior to admission in an Adult Basic Education (ABE) setting.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

When a student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards which the student must master to earn credit must be specified in the student's Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

SCANS Competencies: Instructional strategies for this program must include methods that require students to identify, organize and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate the

methods to improve students' personal qualities and high-order thinking skills.

The typical length of this program for the average achieving student is 600 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
ELECTRICAL POWERLINE INSTALLER - OES 85723615

01.0 Demonstrate proficiency in applying basic electrical/electronic principles.
02.0 Demonstrate proficiency in installing electrical distribution systems.
03.0 Demonstrate proficiency in street and security lighting activities.
04.0 Demonstrate proficiency in maintenance and inspection duties.
05.0 Demonstrate proficiency in troubleshooting and repairing system components.
06.0 Demonstrate proficiency in utilizing electrical line service tools and equipment.
07.0 Demonstrate proficiency in operator functions on high reach trucks.
08.0 Demonstrate proficiency in appropriate communication skills.
09.0 Demonstrate proficiency in appropriate math skills.
10.0 Demonstrate proficiency in appropriate understanding of basic science.
11.0 Demonstrate proficiency in employability skills.
12.0 Demonstrate proficiency in understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Electric Line Service And Repair
Secondary Number:
Postsecondary Number: I460303

OCCUPATIONAL COMPLETION POINT - DATA CODE A
ELECTRICAL POWERLINE INSTALLER - OES 85723615

01.0 DEMONSTRATE PROFICIENCY IN APPLYING BASIC ELECTRICAL/ELECTRONIC PRINCIPLES--The student will be able to:

01.01 Interpret electrical terms.
01.02 Identify electrical symbols.
01.03 Construct common electrical circuits.
01.04 Compute for voltage, current, resistance and power.
01.05 Operate meters to measure electrical properties.
01.06 Discuss transformer theory.
01.07 Apply electronic principles where applicable.
01.08 Interpret electronic terms and symbols.

02.0 DEMONSTRATE PROFICIENCY IN INSTALLING ELECTRICAL DISTRIBUTION SYSTEMS--The student will be able to:

02.01 Set poles manually and using power equipment.
02.02 Transport, unload and position poles.
02.03 Frame pole.
02.04 Install guy anchor and wires.
02.05 Climb poles using climbing equipment.
02.06 Hoist materials or equipment to lines.
02.07 String conductors.
02.08 Cut or splice conductors.
02.09 Sag conductors.
02.10 Install tie wires.
02.11 Fabricate tie wires.
02.12 Install pole equipment (crossarms, transformers, fuse cutouts, insulators, air switches, arrestors and pole steps).
02.13 Install capacitor banks.
02.14 Install substation equipment.
02.15 Install utility meters.
02.16 Cut, thread, and bend metal conduit.
02.17 Install armor rods.
02.18 Install direct burial cable.
02.19 Install cable markers.
02.20 Fabricate underground duct systems.
02.21 Install underground cable ducts.
02.22 Rig manholes for cable pulling.
02.23 Splice high voltage underground cable.
02.24 Terminate high voltage cable underground and above ground.
02.25 Install cable racks.
02.26 Install and test grounding systems.

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03.0 DEMONSTRATE PROFICIENCY IN STREET AND SECURITY LIGHTING ACTIVITIES--The student will be able to:

03.01 Install street light fixtures.
03.02 Install flood light fixtures.
03.03 Install lighting control components.
03.04 Install ballast.
03.05 Isolate system for test.
03.06 Adjust timers and controls.
03.07 Relamp fixtures.

04.0 DEMONSTRATE PROFICIENCY IN MAINTENANCE AND INSPECTION DUTIES--The student will be able to:

04.01 Control vegetation in powerline right-of-way.
04.02 Control vegetation in substations.
04.03 Inspect conductors for uniform sag.
04.04 Inspect poles and crossarms.
04.05 Check for corroded hardware.
04.06 Check fuse cutouts.
04.07 Check high voltage switches.
04.08 Check circuit breakers and regulators.
04.09 Inspect fences and warning signs.
04.10 Perform di-electric tests.
04.11 Perform load test.
04.12 Maintain all electrical components.
04.13 Recover equipment.
04.14 Read service meters.
04.15 Realign existing poles.
04.16 Pump water from manholes.
04.17 Check for deterioration of cable, connectors, and poles.

05.0 DEMONSTRATE PROFICIENCY IN TROUBLESHOOTING AND REPAIRING SYSTEM COMPONENTS--The student will be able to:

05.01 Replace defective conductor.
05.02 Transfer dead conductor to new pole.
05.03 Remove foreign objects from conductor.
05.04 Transfer hot conductor to new pole.
05.05 Splice dead or hot conductors.
05.06 Convert transformer banks to open delta.
05.07 Replace crossarms.
05.08 Climb through hot equipment using rubber protective devices.
05.09 Trace faulty underground cable.
05.10 Replace substation breakers, transformers, regulators, and relays.

06.0 DEMONSTRATE PROFICIENCY IN UTILIZING ELECTRICAL LINE SERVICE TOOLS AND EQUIPMENT--The student will be able to:

06.01 Utilize handtools safely.
06.02 Utilize hotline tools safely.
06.03 Utilize rubber protection as needed.
06.04 Operate pool trailer.

06.05 Operate reel jacks.
06.06 Operate cable pulling guide.
06.07 Operate shop power tools.
06.08 Operate hoist.
06.09 Operate climbing equipment.
06.10 Operate multimeter.
06.11 Operate clamp-on ammeter.
06.12 Operate phase rotation meter.
06.13 Operate meter.
06.14 Operate gas detector.
06.15 Operate hot stick tester.
06.16 Operate high voltage phase tester.
06.17 Operate recording ammeter/voltmeter.
06.18 Operate relay tester.
06.19 Operate vibro ground
06.20 Operate power trencher.
06.21 Clean facilities and shop.

07.0 DEMONSTRATE PROFICIENCY IN OPERATOR FUNCTIONS ON HIGH REACH TRUCK--The student will be able to:

07.01 Operate line maintenance truck.
07.02 Operate high reach.
07.03 Test reach booms.
07.04 Position truck safely.

08.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

08.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
08.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
08.03 Read and follow written and oral instructions.
08.04 Answer and ask questions coherently and concisely.
08.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
08.06 Demonstrate appropriate telephone/communication skills.

09.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE MATH SKILLS--The student will be able to:

09.01 Read and interpret measuring devices (rules and tapes).
09.02 Add 100 addition combinations.
09.03 Add two-digit numbers.
09.04 Add three-digit numbers.
09.05 Subtract 100 subtraction combinations.
09.06 Subtract two-, three- and four-digit numbers.
09.07 Solve one-digit divisor problems.
09.08 Solve two-digit divisor problems.
09.09 Solve two- and three-digit divisor problems.
09.10 Solve multiplication facts.
09.11 Multiply by a one-digit factor.

09.12 Multiply by a two-digit factor.
09.13 Identify the parts of a fraction.
09.14 Solve fractional word problems.
09.15 Classify types of fractions.
09.16 Illustrate equivalent fractions.
09.17 Convert fractions.
09.18 Reduce fractions.
09.19 Solve decimal notations.
09.20 Solve number word problems.
09.21 Round to the nearest whole number.
09.22 Add decimals.
09.23 Subtract decimals.
09.24 Multiply decimals.
09.25 Divide a decimal by a decimal.
09.26 Divide a whole number by a decimal.
09.27 Write fractions as decimals and percents.
09.28 Write percents add fractions and decimals.
09.29 Solve percent problems.
09.30 Find the percent of a number.
09.31 Operate a calculator.
09.32 Understand and use the metric system.
09.33 Convert inches to millimeters and millimeters to inches.
09.34 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
09.35 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
09.36 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
09.37 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
09.38 Demonstrate an understanding of federal, state and local taxes and their computation.

10.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

10.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
10.02 Draw conclusions or make inferences from data.
10.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
10.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

11.0 DEMONSTRATE PROFICIENCY IN EMPLOYABILITY SKILLS--The student will be able to:

11.01 Conduct a job search.
11.02 Secure information about a job.
11.03 Identify documents which may be required when applying for a job interview.
11.04 Complete a job application form correctly.
11.05 Demonstrate competence in job interview techniques.

11.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
11.07 Identify acceptable work habits.
11.08 Demonstrate knowledge of how to make job changes appropriately.
11.09 Demonstrate acceptable employee health habits.
11.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

12.0 DEMONSTRATE PROFICIENCY IN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

12.01 Define entrepreneurship.
12.02 Describe the importance of entrepreneurship to the American economy.
12.03 List the advantages and disadvantages of business ownership.
12.04 Identify the risks involved in ownership of a business.
12.05 Identify the necessary personal characteristics of a successful entrepreneur.
12.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Electric Motor and Generator Mechanics
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I470107**
CIP Number	0647.010700
Grade Level	30, 31
Length	1200 hours
Certification	ELECTRICAL @7 G
	TEC ELEC @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for initial employment as electric motor repairers (85714622), (721.281-018) or to provide supplemental training for persons previously or currently employed in this occupation.

The content should include, but not be limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and the assembly, installation, testing, maintenance and repair of electric motors, generators, transformers and related equipment.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Electric Motor and Generator Mechanics industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in the use of tools and equipment required to test, maintain, and rebuild electric motors, ranging from domestic to commercial application.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 8.0, Language 8.0, Reading 8.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1200 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate knowledge of procedures.
02.0 Demonstrate knowledge of safety procedures.
03.0 Demonstrate knowledge of electrical fundamentals.
04.0 Demonstrate use of hand tools and bench skills.
05.0 Identify and describe operation of electrical and mechanical components of electric motors and controls.
06.0 Demonstrate use of test equipment.
07.0 Demonstrate understanding of theory and characteristics of electric motors.
08.0 Demonstrate troubleshooting skills.
09.0 Repair electric motors.
10.0 Perform rewinding operations.
11.0 Perform preventative maintenance.
12.0 Install component protectors and controls.
13.0 Select motor replacements.
14.0 Demonstrate appropriate communication skills.
15.0 Demonstrate appropriate math skills.
16.0 Demonstrate appropriate understanding of basic science.
17.0 Demonstrate employability skills.
18.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Electric Motor And Generator Mechanics
Secondary Number:
Postsecondary Number: I470107

01.0 DEMONSTRATE KNOWLEDGE OF PROCEDURES--The student will be able to:

- 01.01 Demonstrate understanding of school policies and procedures.
- 01.02 Explain shop safety rules.
- 01.03 List opportunities and qualification for employment in the electric motor trade.

02.0 DEMONSTRATE KNOWLEDGE OF SAFETY PROCEDURES--The student will be able to:

- 02.01 Locate and identify types of fire extinguishers in classroom and shop areas.
- 02.02 Demonstrate the safe use of shop equipment.
- 02.03 Identify electrical shock hazards.

03.0 DEMONSTRATE KNOWLEDGE OF ELECTRICAL FUNDAMENTALS--The student will be able to:

- 03.01 Explain electrical theory in circuits as it relates to direct and alternating current.
- 03.02 Analyze and explain series, parallel and series - parallel circuits using Ohms law.
- 03.03 Explain magnetic theory as it relates to the production of electricity.
- 03.04 Recognize and draw basic electrical circuits and symbols.

04.0 DEMONSTRATE USE OF HAND TOOLS AND BENCH SKILLS--The student will be able to:

- 04.01 Name, identify, use and maintain hand tools.
- 04.02 Use and maintain measuring instruments.
- 04.03 Use and maintain drills.
- 04.04 Use and maintain grinders.
- 04.05 Use and maintain presses.
- 04.06 Use and maintain impact tools.
- 04.07 Soft solder wires and components.
- 04.08 Perform acetylene welding, brazing, and cutting of ferrous and non-ferrous materials.
- 04.09 Perform electric welding and cutting.
- 04.10 Perform basic trueing on a metal lathe.
- 04.11 Perform basic straightening on a lathe.
- 04.12 Perform basic machining on a lathe.
- 04.13 Perform basic undercutting on a lathe.

05.0 IDENTIFY AND DESCRIBE OPERATION OF ELECTRICAL AND MECHANICAL COMPONENTS OF ELECTRIC MOTORS AND CONTROLS--The student will be able to:

05.01 Identify and describe electrical components and their function.
05.02 Adjust electrical components.
05.03 Identify, test and adjust mechanical components.

06.0 DEMONSTRATE USE OF TEST EQUIPMENT--The student will be able to:

06.01 Demonstrate the safe and proper use of basic test equipment.
06.02 Demonstrate the use of a volt-ohm meter to find voltage in a specific electrical circuit.
06.03 Demonstrate the use of a volt-ohm meter to find resistance in a specific electrical circuit.
06.04 Demonstrate various methods for testing electric motor windings and coils for grounds and shorts.
06.05 Test open circuits in windings.
06.06 Diagnose a burned-out winding, using odor, visual inspection and the use of test equipment.
06.07 Test related electrical components for electric motors using the proper equipment.

07.0 DEMONSTRATE UNDERSTANDING OF THEORY AND CHARACTERISTICS OF ELECTRIC MOTORS--The student will be able to:

07.01 Describe the operation of shaded pole motors.
07.02 Describe the operation of split phase motors.
07.03 Describe the operation of permanent split-capacitor motors.
07.04 Describe the operation of capacitor start motors.
07.05 Describe the operation of repulsion induction motors.
07.06 Describe the operation of capacitor start-capacitor run motors.
07.07 Read and interpret schematics for split phase motors.
07.08 Read and interpret schematics for permanent split-capacitor motors.
07.09 Read and interpret schematics for capacitor start motors.
07.10 Read and interpret schematics for shaded pole motors.
07.11 Read and interpret schematics for capacitor start-capacitor run motors.
07.12 Read and interpret schematics for repulsion induction motors.
07.13 Read and interpret line and circular diagrams for internal connections of basic single phase motors.
07.14 Read and interpret basic schematics for Wye(star) and Delta Polyphase motors.
07.15 Read and interpret line and circular diagrams for the internal connections of basic Wye(star) and Delta Polyphase motors.

08.0 DEMONSTRATE TROUBLESHOOTING SKILLS--The student will be able to:

08.01 Demonstrate proper troubleshooting techniques.
08.02 Perform visual and odor inspections.
08.03 Demonstrate proper use of VOM, series test light, armatures and megger.
08.04 Bench test for grounds.
08.05 Bench test for proper amperage.
08.06 Perform noise/sound tests.
08.07 Demonstrate use of factory reference manuals.
08.08 Troubleshoot grounded motor on component.

08.09 Locate open circuit in motor or component.
08.10 Locate short in motor or component.
08.11 Locate burned out fault in motor or component.

09.0 REPAIR ELECTRIC MOTORS--The student will be able to:

09.01 Properly mark parts and disassemble motors.
09.02 Complete work order for troubleshooting results, proper operating voltage, and direction of rotation, work to be done and work completed.
09.03 Visually inspect and test electrical and mechanical component parts.
09.04 Clean and lubricate component parts.
09.05 Adjust, service, and replace component parts.
09.06 Properly reassemble and safety bench test electric motors using the proper test equipment.
09.07 Demonstrate safe work habits while performing manipulative skills.
09.08 Wash and paint motors.
09.09 Clean or replace name plates.
09.10 Polish, dress and lubricate shafts.

10.0 PERFORM REWINDING OPERATIONS--The student will be able to:

10.01 Identify and record external lead and wiring connections.
10.02 Draw internal winding connections.
10.03 Complete accurate data card including external and internal connections and winding information.
10.04 Rewind and connect stators and armatures to industry standards.
10.05 Test winding for grounds, shorts and opens using the proper test equipment.
10.06 Demonstrate safe work habits while performing manipulative skills.

11.0 PERFORM PREVENTATIVE MAINTENANCE--The student will be able to:

11.01 Service, clean, lubricate and adjust components and motors while performing preventive maintenance.
11.02 Use proper safety precautions while performing preventive maintenance.

12.0 INSTALL COMPONENTS PROTECTORS AND CONTROLS--The student will be able to:

12.01 List the types and explain the application and operation of motor protectors listed.
12.02 List the types and explain the application and operation of motor controls listed.
12.03 Safely install component protectors and controls.

13.0 SELECT MOTOR REPLACEMENTS--The student will be able to:

13.01 Explain the information found on the motor nameplate as specified by the instructor.

13.02 Select proper motor replacements as specified by the instructor.

14.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

14.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
14.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
14.03 Read and follow written and oral instructions.
14.04 Answer and ask questions coherently and concisely.
14.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
14.06 Demonstrate appropriate telephone/communication skills.

15.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

15.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
15.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
15.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
15.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
15.05 Demonstrate an understanding of federal, state and local taxes and their computation.

16.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

16.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
16.02 Draw conclusions or make inferences from data.
16.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
16.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

17.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

17.01 Conduct a job search.
17.02 Secure information about a job.
17.03 Identify documents which may be required when applying for a job interview.
17.04 Complete a job application form correctly.
17.05 Demonstrate competence in job interview techniques.
17.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
17.07 Identify acceptable work habits.
17.08 Demonstrate knowledge of how to make job changes appropriately.

17.09 Demonstrate acceptable employee health habits.
17.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

18.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

18.01 Define entrepreneurship.
18.02 Describe the importance of entrepreneurship to the American economy.
18.03 List the advantages and disadvantages of business ownership.
18.04 Identify the risks involved in ownership of a business.
18.05 Identify the necessary personal characteristics of a successful entrepreneur.
18.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Electrical Power Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.030200
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as an electrical and electronics technician, power generation and distribution technician, engineering aide, engineering technician, engineering assistant, instrumentation technician, relay technician, electrical technician, test technician, rotating machinery technician, research technician, research and development technician and calibration lab technician or in a related occupation in electrical power.

Graduates of this program will be prepared for entry-level employment in electrical power technology related occupations.

The program content includes, but is not limited to, DC/AC circuits, power generation, power distribution, instrumentation and electrical network analysis, design, theory, solid state devices, and analog circuits. Integrated into this content will be communications skills, leadership skills, human relations skills, employability skills, safe and efficient workplace practices, use of circuit diagrams and schematics, soldering, laboratory practices, and technical recording and reporting.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Electrical Power industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Electrical energy laboratory activities are an integral part of this program. The tools, test equipment, materials, and processes used in this laboratory are similar to those used in industry. Students should be able to use the various types of precision test equipment found in general use throughout the electrical energy industry for the purpose of analyzing, troubleshooting and repairing electrical energy equipment.

III. **SPECIAL NOTE:** The program shall contain a core of general education courses which include components in the areas of oral and written communication skills, computation skills in algebra and trigonometry. A minimum of 15 semester credit hours of college level general education preparation is necessary to ensure graduates are able to function on a

life-long basis in a rapidly changing and increasingly technical occupation.

On site visits to electrical power facilities for practical experience are essential to the program.

Algebra is recommended as a prerequisite for entry into the program.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The standard credit hour length for this program is 68 according to SBR 6A-14.030.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in laboratory practices.
02.0 Demonstrate proficiency in DC circuits.
03.0 Demonstrate proficiency in AC circuits.
04.0 Demonstrate proficiency in solid state devices.
05.0 Demonstrate proficiency in technical recording and reporting.
06.0 Demonstrate proficiency in DC network analysis.
07.0 Demonstrate proficiency in AC network and coupled circuit analysis.
08.0 Demonstrate proficiency in principles of rotating machinery.
09.0 Demonstrate proficiency in principles of power generation systems.
10.0 Demonstrate proficiency in principles of transformers.
11.0 Demonstrate proficiency in principles of power transmission systems.
12.0 Demonstrate proficiency in principles of power distribution systems.
13.0 Demonstrate proficiency in principles of switchgear, motor control centers, control panels and AC breaker panels.
14.0 Demonstrate proficiency in interpretation of electric codes.
15.0 Demonstrate proficiency in employability skills.
16.0 Demonstrate an understanding of entrepreneurship.

GENERATION OPTION

17.0 Demonstrate proficiency in generators, exciters, and voltage regulators.
18.0 Demonstrate proficiency in transformers.
19.0 Demonstrate proficiency in switchgear, motor control centers, breakers panels, and AC and DC plant power distribution.
20.0 Demonstrate proficiency in protective devices.
21.0 Demonstrate proficiency in power cable, control cable, instrumentation cable and raceways.
22.0 Demonstrate proficiency in grounding.
23.0 Demonstrate proficiency in motors.

24.0 Demonstrate proficiency in the plant cycle (both I & C and electric).
25.0 Demonstrate proficiency in electric motors.

INSTRUMENTATION and CONTROL OPTION

26.0 Demonstrate proficiency in the plant cycle (both I & C and electric).
27.0 Demonstrate proficiency in primary elements and transmitters.
28.0 Demonstrate proficiency in final elements.
29.0 Demonstrate proficiency in process control.
30.0 Demonstrate proficiency in microprocessor systems.
31.0 Demonstrate proficiency in combustion control.
32.0 Demonstrate proficiency in electric motor control.
33.0 Demonstrate proficiency in digital circuits.

DISTRIBUTION OPTION

34.0 Demonstrate proficiency in the application of transformers.
35.0 Demonstrate proficiency in the use of electrical equipment.
36.0 Demonstrate proficiency in the principles of system protection.
37.0 Demonstrate proficiency in 3 phase power systems analysis.
38.0 Demonstrate proficiency in distribution circuit design.
39.0 Demonstrate proficiency in basic surveying skills.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Electrical Power Technology
Secondary Number:
Postsecondary Number: 0615.030200

01.0 DEMONSTRATE PROFICIENCY IN LABORATORY PRACTICES--The student will be able to:

- 01.01 Apply proper OSHA safety standards.
- 01.02 Make electrical connections to include power conductor connections.
- 01.03 Identify and use hand tools properly.
- 01.04 Identify and use power tools properly.
- 01.05 Demonstrate acceptable soldering and desoldering techniques.

02.0 DEMONSTRATE PROFICIENCY IN DC CIRCUITS--The student will be able to:

- 02.01 Solve algebraic problems to include exponentials (prerequisite to DC content).
- 02.02 Solve problems in electronic units utilizing metric prefixes.
- 02.03 Relate electricity to the nature of the matter.
- 02.04 Identify sources of electricity.
- 02.05 Define voltage, current, resistance, power and energy.
- 02.06 Apply OHM's Law and power formula.
- 02.07 Read and interpret color codes and symbols to identify electrical components and values.
- 02.08 Measure properties of a circuit using VOM and DVM meters and oscilloscopes.
- 02.09 Compute conductance and measure resistance of conductors and insulators.
- 02.10 Apply OHM's Law to series circuits.
- 02.11 Construct and verify the operation of series circuits.
- 02.12 Analyze and troubleshoot series circuits.
- 02.13 Apply OHM's Law to parallel circuits.
- 02.14 Construct and verify the operation of a parallel circuit.
- 02.15 Analyze and troubleshoot parallel circuits.
- 02.16 Apply OHM's Law to series-parallel/parallel-series circuits.
- 02.17 Construct and verify the operation of series-parallel/parallel-series and bridge circuits.
- 02.18 Troubleshoot series-parallel/parallel-series and bridge circuits.
- 02.19 Identify and define voltage divider circuits (loaded and unloaded).
- 02.20 Construct and verify the operation of voltage divider circuits (loaded and unloaded).
- 02.21 Analyze and troubleshoot voltage divider circuits (loaded and unloaded).
- 02.22 Apply maximum power transfer theory.
- 02.23 Construct and verify the operation of circuits that demonstrate the maximum power transfer theory.
- 02.24 Describe magnetic properties of circuits and devices.

02.25 Determine the physical and electrical characteristics of capacitors and inductors.
02.26 Define RC and RL time constants and classify the output of differentiators and integrators.
02.27 Set up and operate power supplies for DC circuits.

03.0 DEMONSTRATE PROFICIENCY IN AC CIRCUITS--The student will be able to:

03.01 Solve basic trigonometric problems as applicable to electrical technology (prerequisite to AC).
03.02 Identify properties of an AC signal.
03.03 Identify AC sources.
03.04 Analyze and measure AC signals utilizing VOM, DVM, oscilloscope, frequency counter, and function generator.
03.05 Define the characteristics of AC capacitive circuits.
03.06 Construct and verify the operation of AC capacitive circuits.
03.07 Analyze and troubleshoot AC capacitive circuits.
03.08 Define the characteristics of AC inductive circuits.
03.09 Construct and verify the operation of AC inductive circuits.
03.10 Analyze and troubleshoot AC inductive circuits.
03.11 Define and apply the principles of transformers to AC.
03.12 Construct and verify the operation of AC circuits utilizing transformers.
03.13 Analyze and troubleshoot AC circuits utilizing transformers.
03.14 Construct and verify the operation of differentiators and integrators to determine RC and RL Time constants.
03.15 Analyze and troubleshoot differentiator and integrator circuits.
03.16 Define the characteristics of RLC circuits (series, parallel, and complex).
03.17 Construct and verify the operation of RLC circuits (series, parallel, and complex).
03.18 Define the characteristics of series and parallel resonant circuits.
03.19 Construct and verify the operation of series and parallel resonant circuits.
03.20 Analyze and troubleshoot RC, RL, and RLC circuits.
03.21 Define the characteristics of polyphase circuits.
03.22 Define the basic motor theory and operation.
03.23 Define the basic generator theory and operation.
03.24 Set up and operate power supplies for AC circuits.
03.25 Analyze and measure power in AC circuits (real, reactive and apparent power).
03.26 Set up and operate capacitor/inductor analyzers for AC circuits.

04.0 DEMONSTRATE PROFICIENCY IN SOLID STATE DEVICES--The student will be able to:

04.01 Identify and define properties of semiconductor materials.
04.02 Identify and define operating characteristics and applications of junction diodes.
04.03 Identify and define operating characteristics and applications of special diodes (xener, M.O.V. for example metal oxide).

04.04 Construct diodes circuits.
04.05 Analyze and troubleshoot diode circuits.
04.06 Identify and define operating characteristics and application of bipolar transistors.
04.07 Identify and define operating characteristics and applications of field effect transistors. (FET's).
04.08 Identify and define operating characteristics and applications of single stage amplifiers.
04.09 Construct single-stage amplifiers.
04.10 Analyze and troubleshoot single-stage amplifiers.
04.11 Construct thyristor circuitry.
04.12 Analyze and troubleshoot thyristor circuitry.
04.13 Set up and operate a VOM for solid-state devices.
04.14 Set up and operate a DVM for solid state devices.
04.15 Set up and operate power supplies for solid-state devices.
04.16 Set up and operate oscilloscopes for solid-state devices.
04.17 Set up and operate function generators for solid-state devices.
04.18 Set up and operate capacitor/inductor analyzers for solid state devices.
04.19 Set up and operate curve tracers.
04.20 Set up and operate transistor testers.

05.0 DEMONSTRATE PROFICIENCY IN TECHNICAL RECORDING AND REPORTING--The student will be able to:

05.01 Draw engineering electrical sketches, interpret electrical schematics, wiring diagrams, charts, graphs and geographical sketches.
05.02 Record data and design curves and graphs.
05.03 Write reports and make oral presentations.
05.04 Maintain test logs.
05.05 Make equipment failure reports.
05.06 Specify and requisition simple electrical components.
05.07 Compose technical letters and memoranda.
05.08 Write formal reports of laboratory experiences.
05.09 Draft installation preventive maintenance and calibration procedures.

06.0 DEMONSTRATE PROFICIENCY IN DC NETWORK ANALYSIS--The student will be able to:

06.01 Analyze multisource circuits using Millman's Theorem.
06.02 Analyze multisource circuits using Superimposition Theorem.
06.03 Analyze multisource circuits using Mesh Currents.
06.04 Analyze multisource circuits using Branch Currents.
06.05 Analyze multisource circuits using Nodal Analysis.
06.06 Analyze multisource circuits using Thevenin's Theorem.
06.07 Analyze multisource circuits using Norton's Theorem.
06.08 Analyze DC circuits using computer programs.

07.0 DEMONSTRATE PROFICIENCY IN AC NETWORK AND COUPLED CIRCUIT ANALYSIS--The student will be able to:

07.01 Design and analyze magnetic circuits.

07.02 Apply Faraday's Law of induced voltages.
07.03 Solve for mutual inductance in a coupled circuit.
07.04 Analyze AC circuits using network theorems.
07.05 Solve problems in transient analysis in RC and RL circuits.
07.06 Demonstrate and analyze the effects of loading on transformers.
07.07 Analyze RLC circuits using complex numbers.
07.08 Design, construct, and analyze RC/RCL filters.
07.09 Analyze AC circuits using computer programs.

08.0 DEMONSTRATE PROFICIENCY IN PRINCIPLES OF ROTATING MACHINERY--The student will be able to:

08.01 Identify and define the characteristics of DC, series, shunt, compound motors, and generators.
08.02 Identify and define the characteristics of AC, single phase, and polyphase motors.
08.03 Set up and operate DC and AC motors.

09.0 DEMONSTRATE PROFICIENCY IN PRINCIPLES OF POWER GENERATION SYSTEMS--The student will be able to:

09.01 Identify the elements of a power generation system.
09.02 Solve problems involving alternators.

10.0 DEMONSTRATE PROFICIENCY IN PRINCIPLES OF POWER TRANSFORMERS--The student will be able to:

10.01 Identify the characteristics of power transformers.
10.02 Solve problems involving the application of power transformers.

11.0 DEMONSTRATE PROFICIENCY IN PRINCIPLES OF POWER TRANSMISSION SYSTEMS--The student will be able to:

11.01 Identify power transmission lines.
11.02 Solve problems involving transmission lines.

12.0 DEMONSTRATE PROFICIENCY IN PRINCIPLES OF POWER DISTRIBUTION SYSTEMS--The student will be able to:

12.01 Identify power distribution systems.
12.02 Solve problems involving distribution systems.

13.0 DEMONSTRATE PROFICIENCY IN PRINCIPLES OF SWITCHGEAR, MOTOR CONTROL CENTERS, AND AC BREAKER PANELS--The student will be able to:

13.01 Identify the properties of switchgears.
13.02 Describe the operation of switchgear, motor control centers, and AC breaker panels.

14.0 DEMONSTRATE PROFICIENCY IN INTERPRETATION OF ELECTRIC CODES--The student will be able to:

14.01 Understand the need for the IEEE (Institute of Electrical, Electronics and Engineers), NEMA (National Electrical

Manufacturers Association) and ANSI (American National Standards Institute) codes.

14.02 Demonstrate proficiency in interpretation/explanation of the IEEE (Institute of Electrical, Electronics and Engineers), NEMA (National Electrical Manufacturers Association) and ANSI (American National Standards Institute) codes.

15.0 DEMONSTRATE PROFICIENCY IN EMPLOYABILITY SKILLS--The student will be able to:

15.01 Conduct a job search.
15.02 Secure information about a job.
15.03 Identify documents that may be required when applying for a job.
15.04 Complete a job application form correctly.
15.05 Demonstrate competence in job interview techniques.
15.06 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

16.01 Define entrepreneurship.
16.02 Describe the importance of entrepreneurship to the American economy.
16.03 List the advantages and disadvantages of business ownership.
16.04 Identify the risks involved in ownership of a business.
16.05 Identify the necessary personal characteristics of a successful entrepreneur.
16.06 Identify the business skills needed to operate a small business efficiently and effectively.

GENERATION OPTION

17.0 DEMONSTRATE PROFICIENCY IN GENERATORS, EXCITERS, AND VOLTAGE REGULATORS--The student will be able to:

17.01 Demonstrate proficiency in the principals of generators.
17.02 Identify the magnetic field associated with a generator.
17.03 Identify positive and negative rotation.
17.04 Identify the purpose and function of a generator or field ground circuit.
17.05 Identify the different methods of excitation.
17.06 Identify the most common parameters of a generator.
17.07 Identify each component of the generator, how they interrelate and their individual function.

18.0 DEMONSTRATE PROFICIENCY IN TRANSFORMERS--The student will be able to:

18.01 Demonstrate proficiency in the principles of transformers including the autotransformer.
18.02 Identify the magnetic fields associated with a transformer.
18.03 Identify the characteristics of a power transformer.
18.04 Identify and make proper single phase transformer connections.

18.05 Identify and make proper three phase (delta, WYE) transformer connections.
18.06 Make proper tap changes.
18.07 Analyze the ideal circuit model of a transformer.
18.08 Identify and analyze transformer nomenclature, polarity, name plate data and ratings.
18.09 Identify and analyze transformer losses and efficiency.
18.10 Perform basic maintenance procedures and testing including oil testing and ratio test phasing.
18.11 Locate and correct fault currents.

19.0 DEMONSTRATE PROFICIENCY IN SWITCHGEAR, MOTOR CONTROL CENTERS, BREAKER PANELS, AND AC AND DC PLANT POWER DISTRIBUTION--The student will be able to:

19.01 Demonstrate proficiency in the various classifications and components of switchgear, motor control centers, and distribution breaker panels.
19.02 Demonstrate knowledge in the standards that govern the application of switchgear, motor control centers, and breaker panel (NEMA standards, IEEE National Electric Code).
19.03 Demonstrate knowledge in fault current calculations equipment rational (continuous, interrupt, and with standard capabilities).
19.04 Demonstrate knowledge of insulation test materials and the application of various test equipment (Megger, hi-pot, Doble).
19.05 Demonstrate knowledge in cable entry and termination. This includes power cable, control cable, shield terminations, current transformer, and potential transformer locations and wiring ratings.
19.06 Demonstrate knowledge in plant one line electrical diagram configurations and various distribution systems to include auxiliary power systems, reserve power systems, DC power systems, automatic power systems and automatic transfer systems.
19.07 Demonstrate the application of plant one line electrical diagram configurations and various distribution systems to include auxiliary power systems, reserve power systems, DC power systems, automatic power systems and automatic transfer systems.
19.08 Identify the characteristics of fused panels and breaker panels.
19.09 Demonstrate knowledge and use (application) of ground bus, neutral bus, and grounded neutral bus.
19.10 Demonstrate proficiency in plant DC power distribution systems to include batteries (inverters and troubleshooting techniques).

20.0 DEMONSTRATE PROFICIENCY IN PROTECTIVE DEVICES--The student will be able to:

20.01 Demonstrate knowledge of what a protective devise is for motors, generators, transformers and switchgear and why they are necessary.

20.02 Demonstrate proficiency in understanding the IEEE standard device numbering system.

20.03 Demonstrate knowledge in various categories of protective devices and their coordination (overcurrent, differential, etc.).

20.04 Perform an acceptance test on a breaker, fuse, and overcurrent relay.

20.05 Demonstrate proficiency in selecting the correct protective device and its rating for a motor, cable and lighting load.

20.06 Know of potential transformers, current transformers and their application in metering and protection circuits.

21.0 DEMONSTRATE PROFICIENCY IN POWER CABLE, CONTROL CABLE, INSTRUMENTATION CABLE AND RACEWAYS--The student will be able to:

21.01 Demonstrate proficiency in how power cables, control cables and instrumentation cables are constructed.

21.02 Demonstrate proficiency in the standard voltage ratings of power cables, control cables and instrumentation cables.

21.03 Demonstrate proficiency in the standard current ratings of power cables and control cables.

21.04 Demonstrate proficiency in power cable

(a) effects of heat (internal and external) on the ampacity rating of a cable,

(b) magnetic effects between conductors,

(c) knowledge of when the ground shields are necessary and how to terminate them,

(d) methods of installing power cables in conduits, trays, and ductbanks (pulling cables, single and multiple groups) and

(e) selecting terminating materials and how they are used.

21.05 Demonstrate proficiency in control cable

(a) identification codes of different conductors within a control cable,

(b) knowledge in selecting terminating materials and equipment,

(c) termination of a control circuit and perform the actual termination, and

(d) proper installation methods (pulling cable, single and multiple groups).

21.06 Demonstrate proficiency in instrumentation cable

(a) the different metals used to make conductors for instrumentation cables,

(b) the effects of large power circuits in close proximity to instrumentation cables,

(c) how and why shields are included in instrumentation cables,

(d) proper methods of installing instrumentation cables in conduits, trays and ductbanks,

(e) knowledge on when to extend ground shield, terminate a ground shield, and the methods used,

(f) how to terminate a thermocouple cable and make actual installation,

(g) knowledge of the standard conductor identification methods, and

(h) differences between thermocouple extension cable.

22.0 DEMONSTRATE PROFICIENCY IN GROUNDING--The student will be able to:

22.01 Explain why grounding is necessary.
22.02 Demonstrate knowledge in how ground circuits are necessary for the interruptions of protective devices.
22.03 Demonstrate knowledge in how ground systems protect individuals from shocks.
22.04 Demonstrate proficiency in layout, installing, and sizing ground conductors.
22.05 Demonstrate proficiency in the magnetic effects of phase conductors and ground conductors.
22.06 Demonstrate proficiency in the identification of grounding conductors.
22.07 Demonstrate the principals of point source grounding and maintaining it.
22.08 Demonstrate proficiency in ground systems effectiveness.

23.0 DEMONSTRATE PROFICIENCY IN MOTORS--The student will be able to:

23.01 Identify the characteristics needed to properly select a motor for replacement or a new application.
23.02 Demonstrate knowledge of the NEMA Standards MG1 and MG2.
23.03 Identify and test a DC motor for receiving criteria.
23.04 Identify and test a AC motor for receiving criteria.
23.05 Demonstrate proficiency in establishing a motor direction of rotation and changing it. Applicable to AC single phase, AC three phase, DC motors.
23.06 Demonstrate proficiency in the various methods of starting AC and DC motors.
23.07 Demonstrate proficiency in motor control circuits by developing the logic and wiring a control circuit.
23.08 Demonstrate proficiency in control and application of 3 phase synchronize motors.

24.0 DEMONSTRATE PROFICIENCY IN THE PLANT CYCLE (Both I & C and Electric)--The student will be able to:

24.01 Identify and define the basic elements of the basic steam cycle.
24.02 Describe major plant components, such as: boilers, turbine, generators, pollution control equipment, heat exchangers, pumps, etc.
24.03 Demonstrate proficiency in reading and using steam tables, basic heat rate calculations (feed water heater performance).

25.0 DEMONSTRATE PROFICIENCY IN ELECTRIC MOTORS--The student will be able to:
25.01 Read, interpret and troubleshoot from elementary diagrams.
25.02 Demonstrate competency in the elements of the elementary diagrams (relays, timers, limit switches, selector switches).

INSTRUMENTATION and CONTROL OPTION

26.0 DEMONSTRATE PROFICIENCY IN THE PLANT CYCLE (BOTH I & C AND ELECTRIC)--The student will be able to:

26.01 Identify and define the basic elements of the basic steam cycle.
26.02 To describe major plant components, such as: boilers, turbine, generators, pollution control equipment, heat exchangers, pumps, etc.
26.03 Demonstrate proficiency in reading and using steam tables, basic heat rate calculations (feed water heater performance).

27.0 DEMONSTRATE PROFICIENCY IN PRIMARY ELEMENTS AND TRANSMITTERS--The student will be able to:

27.01 Define physical properties relating to pressure, level, temperature, ph, conductivity, vibration, and flow.
27.02 Identify the types and appropriate application of primary elements used in measuring those physical properties.
27.03 Operate basic test equipment (deadweight tester, vacuum pump, potentiometer, thermal bath).
27.04 Setup, calculate and measure the output of primary elements and transmitters under varying conditions.
27.05 Identify and define the operating characteristics of electric and pneumatic transmitters.
27.06 Specify appropriate primary elements and transmitters for basic process measurements (e.g., case ratings, ranges accuracy, basic data sheets, ISA standards).
27.07 Calibrate and troubleshoot transmitters.
27.08 Design, setup and test pneumatic and electronics instrument loops.

28.0 DEMONSTRATE PROFICIENCY IN FINAL ELEMENTS--The student will be able to:

28.01 Define operating characteristics and appropriate applications for control valves (valve sizing calculations, flashing, covitation, types (plug, globe, ball, butterfly) action (linear, quick opening, equal percentage).
28.02 Define operating characteristics for dampers (relationship between driver & flow; cams, types (e.g. guillotine, louver).
28.03 Define the operating characteristics of valve/damper operator: pneumatic, hydraulic, electric and interface devices: SOV's, positioners, I/Ps.
28.04 Calibrate and troubleshoot final elements and interface devices.
28.05 Design, setup and test instrument loop with final element.

29.0 DEMONSTRATE PROFICIENCY IN PROCESS CONTROL--The student will be able to:

29.01 Identify and define the elements of automatic control (integral, derivative, proportional, direct acting, feed forward, ration, cascade, three element feedwater control etc.).

29.02 Analyze and test tuning constant relationships (example: define the output of a process with a set or ramp change using a proportional plus derivative action controller).
29.03 Read, interpret basic functional diagrams.

30.0 DEMONSTRATE PROFICIENCY IN MICROPROCESSOR SYSTEMS--The student will be able to:

30.01 Identify CPU (Architecture) building blocks and their uses.
30.02 Analyze BUS concepts.
30.03 Analyze various memory schemes.
30.04 Use memory devices in circuits.
30.05 Troubleshoot memory-device circuits.
30.06 Set up and operate oscilloscopes for microprocessor systems.
30.07 Set up and operate logic/data analyzers for troubleshooting microprocessor systems.
30.08 Identify types of input and output devices and peripherals.
30.09 Interface input and output ports to peripherals.
30.10 Analyze and troubleshoot input an output ports.
30.11 Specify, program and troubleshoot programmable logic controllers.
30.12 Analyze and troubleshoot a communications link.
30.13 Configure and troubleshoot distributed digital controllers.

31.0 DEMONSTRATE PROFICIENCY IN COMBUSTION CONTROL--The student will be able to:

31.01 Demonstrate competence in the following: steam flow - air flow relationship steam flow - fuel flow relationship fuel flow - air flow relationship excess oxygen steam flow - air flow - fuel flow relationship
31.02 Demonstrate competence in drum level control.
31.03 Define critical protection systems such as implosion protection, burner management systems.
31.04 Read, interpret, and troubleshoot from functional diagrams.

32.0 DEMONSTRATE PROFICIENCY IN ELECTRIC MOTOR CONTROL--The student will be able to:

32.01 Read, interpret and troubleshoot from elementary diagrams.
32.02 Demonstrate competency in the elements of the elementary diagrams (relays, timers, limit switches, selector switches).

33.0 DEMONSTRATE PROFICIENCY IN DIGITAL CIRCUITS--The student will be able to:

33.01 Define and apply numbering systems to codes and arithmetic operations.
33.02 Analyze/minimize logic circuits using Boolean operations.
33.03 Setup and operate logic probes for digital circuits.
33.04 Setup and operate power supplies for digital circuits and solve power distribution and noise problems.
33.05 Set up and operate pulsars for digital circuits.
33.06 Set up and operate oscilloscopes for digital circuits.

33.07 Set up and operate logic analyzers for digital circuits.
33.08 Set up and operate pulse generators for digital circuits.
33.09 Identify types of logic gates and their truth tables.
33.10 Construct combinational logic circuits using integrated circuits.
33.11 Troubleshoot logic circuits.
33.12 Analyze types of flip-flops and their truth tables.
33.13 Construct flip-flops using integrated circuits.
33.14 Troubleshoot flip-flops.
33.15 Identify, define and measure characteristics if integrated circuit (IC) logic families.
33.16 Identify types of registers and counters.
33.17 Construct registers and counters using flip-flops and logic gates.
33.18 Troubleshoot registers and counters.
33.19 Analyze clock and timing circuits.
33.20 Construct clock and timing circuits.
33.21 Troubleshoot clock and timing circuits.
33.22 Identify types of arithmetic-logic circuits.
33.23 Construct arithmetic-logic circuits.
33.24 Troubleshoot arithmetic-logic circuits.
33.25 Identify types of encoding and decoding devices.
33.26 Construct encoders and decoders.
33.27 Troubleshoot encoders and decoders.
33.28 Identify types of multiplexers and demultiplexer circuits.
33.29 Construct multiplexer and demultiplexer circuits using integrated circuits.
33.30 Troubleshoot multiplexer and demultiplexer circuits.
33.31 Identify types of memory circuits.
33.32 Relate the uses of digital-to-analog and analog-to-digital circuits.
33.33 Construct digital-to-analog and analog-to-digital circuits.
33.34 Troubleshoot digital-to-analog and analog-to-digital circuits.
33.35 Identify types of digital displays.
33.36 Construct digital display circuits.
33.37 Troubleshoot digital display circuits.

DISTRIBUTION OPTION

34.0 DEMONSTRATE PROFICIENCY IN THE APPLICATION OF POWER TRANSFORMERS--The student will be able to:

34.01 Demonstrate proficiency in the principles of transformers including the autotransformer.
34.02 Identify the magnetic fields associated with a transformer.
34.03 Identify the characteristics of a power transformer.
34.04 Identify and make proper single phase transformer connections.
34.05 Identify and make proper three phase (delta, WYE) transformer connections.
34.06 Make proper load tap changes.
34.07 Analyze the ideal circuit model of a transformer.
34.08 Identify and analyze transformer nomenclature, polarity, name plate data and ratings.
34.09 Identify and analyze transformer losses and efficiency.

34.10 Perform basic maintenance procedures and testing including oil testing and ratio test phasing.
34.11 Locate and correct fault currents.

35.0 DEMONSTRATE PROFICIENCY IN THE USE OF ELECTRICAL EQUIPMENT--The student will be able to:

35.01 Identify and troubleshoot circuit breakers and reclosers in transmission and distribution systems.
35.02 Identify and analyze the use of conductors (overhead and underground) in transmission and distribution systems.
35.03 Identify the characteristics and uses of poles, wood, concrete and aluminum.
35.04 Identify the types of wood treatments for poles.
35.05 Identify and analyze the use of capacitors, insulators, regulators and arresters.
35.06 Design and analyze guying and anchor systems.
35.07 Make high voltage connections.
35.08 Identify load management devices.
35.09 identify and analyze the use of switches and switchgear.
35.10 Identify and analyze the use of conduit and panel guards.
35.11 Set up and operate instrument transformers PT and CT.
35.12 Identify and analyze, metering systems.
35.13 Identify and analyze lighting systems.

36.0 DEMONSTRATE PROFICIENCY IN THE PRINCIPLES OF SYSTEM PROTECTION--The student will be able to:

36.01 Identify and analyze the sue of feeder breaker recloser and fuses.
36.02 Identify and define the characteristics of a substation.
36.03 Design, identify and analyze motor projection devices.
36.04 Identify and analyze over current and over voltage protection.

37.0 DEMONSTRATE PROFICIENCY IN 3 PHASE POWER SYSTEM ANALYSIS--The student will be able to:

37.01 Covert between physical units (amperes, volts, ohms, watts, and VARS and per unit parameters).
37.02 Analyze radial distribution systems (compute line and phase, voltages, currents and power flows).
37.03 Analyze 3 phase systems on a single phase basis (assume balanced systems).
37.04 Analyze the loading, voltage drops, balance and circuit balance of a 3 phase system.

38.0 DEMONSTRATE PROFICIENCY IN DISTRIBUTION CIRCUIT DESIGN--The student will be able to:

38.01 Define and apply the general principles of surveying.
38.02 Be proficient in the use of and application of survey equipment.
38.03 Identify easements and analyze legal descriptions.

39.0 DEMONSTRATE PROFICIENCY IN BASIC SURVEYING SKILLS--The student will be able to:

39.01 Design basic overhead and underground single and 3 phase line extensions.

39.02 Demonstrate an understanding of fuse and breaker coordination.

39.03 Demonstrate an understanding of the "per unit" system of calculations.

39.04 Demonstrate an understanding of grounded and ungrounded systems.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Electricity
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components	Four Occupational Completion Points

	Secondary	PSAV
Program Numbers	**8727200**	**I460312**
CIP Number	0646.030202	0646.030202
Grade Level	9-12, 30, 31	30, 31
Facility Code	203	203
VSO	VICA	VICA
Co-op Method	Yes	Yes
Apprenticeship	Yes	Yes

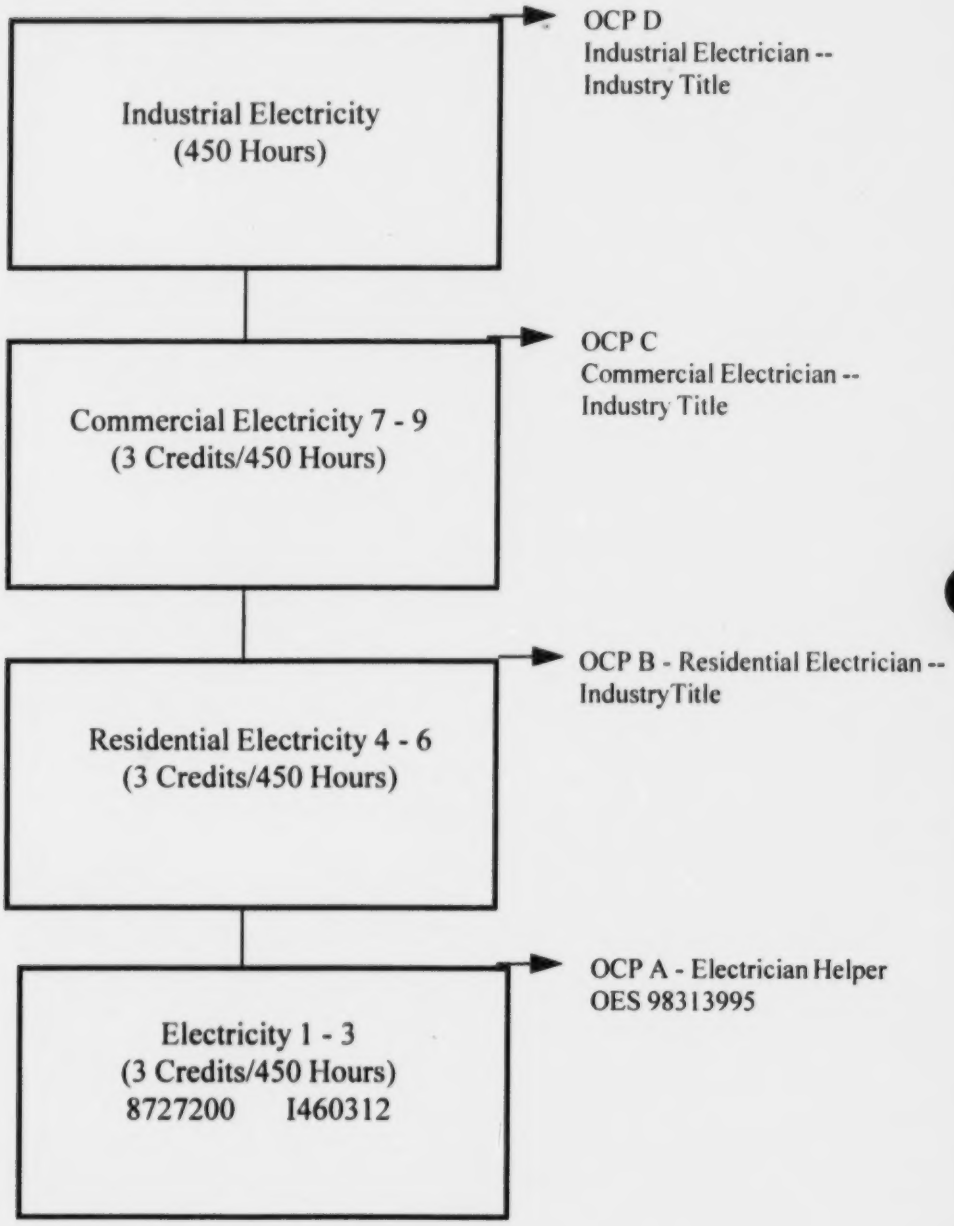
I. **PURPOSE:** The purpose of this program is to prepare students for employment or advanced training in a variety of construction electrical industries. This program also provides supplemental training for persons previously or currently employed in the electrician occupations.

This program focuses on broad, transferable skills, stresses the understanding of all aspects of the electricity industry, and demonstrates such elements of the industry as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

II. **PROGRAM STRUCTURE:** This program is a planned sequence of instruction consisting of four occupational completion points. The recommended sequence allows students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training program or terminate as an occupational completer.

The following diagram illustrates the program structure:

Electricity



At the secondary level, the Electricity program consists of the following courses:

ELECTRICITY COURSES - 3 secondary credits
- 8727210 - Electricity 1
- 8727220 - Electricity 2
- 8727230 - Electricity 3

RESIDENTIAL ELECTRICITY COURSES - 3 secondary credits
- 8727240 - Residential Electricity 4
- 8727250 - Residential Electricity 5
- 8727260 - Residential Electricity 6

COMMERCIAL ELECTRICITY COURSES - 3 secondary credits
- 8727270 - Commercial Electricity 7
- 8727280 - Commercial Electricity 8
- 8727290 - Commercial Electricity 9

III. **LABORATORY ACTIVITIES:** Classroom, shop, and laboratory activities are an integral part of this program. These activities include instruction in the use of the safety procedures, tools, equipment, materials, and processes found in the industry. A generic equipment list for this program is available.

IV. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., (VICA) is the appropriate vocational student organization (VSO) for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The program may be offered in postsecondary adult vocational (PSAV) courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The cooperative method of instruction, on-the-job training (OJT), is appropriate for this program. Whenever the cooperative method is offered, the following are required for each student: (1) a training plan that is signed by the student, teacher, and employer and that includes instructional objectives and a list of on-the-job and in-school learning experiences and (2) a workstation that reflects the equipment, skills, and tasks relevant to the occupation that the student has chosen as a career goal. The student must be paid for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic-skills grade levels required for postsecondary adult vocational students to exit this program are listed before the intended outcomes for the program. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion of the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) or a remedial lab. Please refer to the Rule for exemptions.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

When a secondary student with a disability is enrolled in a vocational class for which modifications to the curriculum framework have been made, the particular outcomes and student performance standards that the student must master to earn credit must be specified in the student's Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

SCANS Competencies: To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this program must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

Florida Department of Education
INTENDED OUTCOMES

Program Title:	**Electricity**	
	Secondary	PSAV
Program Number	**8727200**	**I460312**
CIP Number	0646.030202	0646.030202
Grade Level	9-12, 30, 31	30, 31
Length	9 Credits + 450 PSAV Hours	1800 Hours
Certification	ELECTRICAL @7 G	ELECTRICAL @7 G
Basic Skills		
Math		9
Language		8
Reading		8

INTENDED OUTCOMES: After successfully completing appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
ELECTRICIAN HELPER - DOT Code 829.684-022

01.0 Identify safe working conditions at the laboratory and workplace, and observe safety precautions.
02.0 Demonstrate an understanding of basic direct-current (DC) electrical-circuit skills.
03.0 Demonstrate appropriate communication skills.
04.0 Apply electricity-related basic math.
05.0 Demonstrate an understanding of basic electricity.
06.0 Demonstrate employability skills.
07.0 Read and interpret basic electric codes.
08.0 Demonstrate an understanding of entrepreneurship.
09.0 Demonstrate positive customer-relations skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
RESIDENTIAL ELECTRICIAN - Industry Title

10.0 Demonstrate proficiency in electrical math problems.
11.0 Demonstrate alternating-current (AC) circuit skills.
12.0 Install residential wiring.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
COMMERCIAL ELECTRICIAN - Industry Title

13.0 Install commercial wiring.
14.0 Demonstrate specialized electrical skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE D
INDUSTRIAL ELECTRICIAN - Industry Title

15.0 Demonstrate industrial circuit skills.
16.0 Demonstrate industrial alternating-current (AC) skills.
17.0 Install industrial wiring.
18.0 Install transformers.
19.0 Connect and verify the operation of AC and DC rotating equipment.
20.0 Construct control circuits and install electrical controls and devices.
21.0 Construct DC power supplies and circuits.
22.0 Construct basic-logic circuits.
23.0 Conduct basic-logic circuits.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Electricity
Secondary Number: 87272000
Postsecondary Number: I460312

OCCUPATIONAL COMPLETION POINT - DATA CODE A
ELECTRICIAN HELPER - DOT Code 829.684-022

01.0 IDENTIFY SAFE WORKING CONDITIONS AT THE LABORATORY AND WORKPLACE, AND OBSERVE SAFETY PRECAUTIONS--The student will be able to:

- 01.01 Clean the work area and maintain it in a safe condition.
- 01.02 Apply lab policies and procedures for safety, including fire safety.
- 01.03 Identify and operate workplace-safety electrical devices.
- 01.04 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 01.05 Demonstrate procedures for disaster situations.
- 01.06 Demonstrate the proper use and care of hand and power tools and equipment.
- 01.07 Describe service-truck maintenance and loading procedures.
- 01.08 Identify rigging procedures, including hand signals.
- 01.09 Organize storage areas on site.
- 01.10 Demonstrate a knowledge of CPR (cardiopulmonary resuscitation) and first aid.

02.0 DEMONSTRATE AN UNDERSTANDING OF BASIC DIRECT-CURRENT (DC) ELECTRICAL-CIRCUIT SKILLS--The student will be able to:

- 02.01 Define the terms "voltage," "current," "resistance," "power," and "energy."
- 02.02 Measure voltage, amperage, and resistance, using a volt-ohm meter (VOM) and a digital volt-ohm meter (DVM).
- 02.03 Analyze, construct, and troubleshoot a series, series-parallel, and parallel circuit.
- 02.04 Draw each type of circuit and calculate the circuit values.
- 02.05 Explain and apply Ohm's Law.
- 02.06 Compute conductance and resistance of conductors and insulators.
- 02.07 Discuss motor theory and operation.
- 02.08 Discuss generator theory and operation.

03.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 03.01 Ask and answer questions coherently and concisely.
- 03.02 Read and follow written instructions and listen to and follow oral instructions.
- 03.03 Give reports orally and in writing.

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03.04 Read critically in order to recognize assumptions and implications and to evaluate ideas.
03.05 Find job-related information in technical literature such as a manufacturer's manual.
03.06 Read and interpret the graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
03.07 Write logical and understandable statements or phrases to accurately fill out forms/invoices commonly used in business and industry.
03.08 Communicate job-related information with other trades.
03.09 Demonstrate appropriate telephone communication skills.
03.10 Identify the parts and functions of a computer system.
03.11 Identify the uses of the computer, including applications of the computer in the school, home, and business.
03.12 Perform computer activities by preparing documents with the use of word-processing or database-applications software.

04.0 APPLY ELECTRICITY-RELATED BASIC MATH--The student will be able to:

04.01 Solve basic-math problems related to electrical work.
04.02 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
04.03 Measure tolerances on horizontal and vertical surfaces, using millimeters, centimeters, feet, and inches.
04.04 Convert units of measurement between the English system and the metric system.
04.05 Use scientific notation.
04.06 Demonstrate proficiency with a calculator.
04.07 Solve basic algebraic formulas related to electricity.
04.08 Solve basic trigonometric functions related to electrical wiring.

05.0 DEMONSTRATE AN UNDERSTANDING OF BASIC ELECTRICITY--The student will be able to:

05.01 Explain the principles of electromagnetism.
05.02 Explain the magnetic properties of circuits and devices.
05.03 Relate electricity to the nature of matter.
05.04 Describe various ways that electricity is produced.
05.05 Explain molecular action as a result of temperature extremes, chemical reaction, and moisture content.
05.06 Draw conclusions or make inferences from data.
05.07 Produce voltage by chemical means, mechanical means, thermal means, and photoelectric means.
05.08 Identify blueprint symbols.

06.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

06.01 Conduct a job search and identify career-growth and advanced-training opportunities, including apprenticeship programs.
06.02 Secure information about a job.
06.03 Identify documents that may be required for a job application.
06.04 Complete a job-application form.
06.05 Demonstrate competence in job-interview techniques.

06.06 Demonstrate productive work habits and positive attitudes.
06.07 Demonstrate a knowledge of how to make job changes appropriately.
06.08 Identify ethical practices and responsibilities.
06.09 Demonstrate acceptable personal and professional hygiene.
06.10 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
06.11 Explain the importance of taking pride in the quality of work performed.
06.12 Describe the importance of a drug-free workplace and the industry's policies toward drug use.
06.13 Describe the ramifications of a poor driving record on employability opportunities and maintain a good driver's record.
06.14 Describe "Florida's Right-to-Know" Law as recorded in Florida Statutes, Chapter 442.

07.0 READ AND INTERPRET BASIC ELECTRIC CODES--The student will be able to:

07.01 Describe the importance of following the local, state, and national electric codes.
07.02 Read and interpret basic electric codes, wiring plans, and specifications.
07.03 Identify licensure requirements for electrical occupations.

08.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

08.01 Define "entrepreneurship."
08.02 Describe the importance of entrepreneurship to the American economy and the role of small business in the free-enterprise system.
08.03 List the advantages and disadvantages of business ownership.
08.04 Identify the risks involved in the ownership of a business.
08.05 Identify the personal characteristics of a successful entrepreneur.
08.06 Identify the business skills (including computer skills) needed to operate a small business efficiently and effectively.

09.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

09.01 Exercise self-control.
09.02 Identify and demonstrate appropriate responses to criticism.
09.03 Recognize basic human-relations skills as they relate to success in the electrical industry.
09.04 Resolve customer complaints in a positive, professional manner.
09.05 Demonstrate respect for customer property by cleaning the work area after duties are completed.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
RESIDENTIAL ELECTRICIAN - Industry Title

10.0 DEMONSTRATE PROFICIENCY IN ELECTRICAL MATH SKILLS--The student will be able to:

10.01 Calculate pressure measurement in terms of pounds per square inch (PSI) of mercury and bars.
10.02 Calculate wiring costs.

11.0 DEMONSTRATE ALTERNATING-CURRENT (AC) CIRCUIT SKILLS--The student will be able to:

11.01 Identify the physical and electrical characteristics of capacitors and inductors.
11.02 Demonstrate proficiency in measuring, testing, and connecting a transformer.
11.03 Set up and utilize a watt-hour meter.
11.04 Apply the principles of transformers to AC circuits.
11.05 Connect, analyze, and troubleshoot power and control transformers according to the appropriate local, state, or national electric codes.

12.0 INSTALL RESIDENTIAL WIRING--The student will be able to:

12.01 Troubleshoot residential electric circuits.
12.02 Drill holes in metal, wood, and concrete for electrical wiring.
12.03 Identify and select tools, equipment, materials, and wires to complete a job.
12.04 Lay out electrical devices, complying with regulations.
12.05 Install the following, complying with the appropriate local, state, or national electric codes:
a. conductors and cable
b. standard outlets and switch boxes
c. cords on major appliances
d. switches, receptacles, and dimmers, including a single-pole switched lighting circuit, a three-way switched lighting circuit, and a four-way combination circuit.
12.06 Operate portable power generators.
12.07 Identify residential-wiring requirements and specifications in accordance with a wiring plan.
12.08 Draw a residential wiring plan, using electrical-wiring symbols.
12.09 Identify and install a recessed lighting fixture, a fluorescent lighting fixture, and a surface lighting fixture according to the specifications, complying with the appropriate local, state, or national electric codes.
12.10 Identify, install, and wire a space-heating circuit, duplex-receptacle-outlet circuit, a split-circuit duplex-receptacle-outlet circuit, and a special-purpose receptacle-outlet circuit according to the specifications, complying with the appropriate local, state, or national electric codes.
12.11 Install and wire a low-voltage signal system.
12.12 Install conduit systems.
12.13 Provide power for heating, ventilation, and air-conditioning equipment.

12.14 Install the following, complying with the appropriate local, state, or national electric codes:
- a. service-entrance main panel
- b. service-entrance meter base
- c. remote-control lighting circuit
- d. alarm system/smoke detectors

12.15 Demonstrate a knowledge of the requirements for the installation of a swimming-pool electrical system.

12.16 Connect single-phase and three-phase transformers.

OCCUPATIONAL COMPLETION POINT - DATA CODE C

COMMERCIAL ELECTRICIAN - Industry Title

13.0 INSTALL COMMERCIAL WIRING--The student will be able to:

13.01 Read and interpret a commercial wiring plan and specifications.

13.02 Draw a commercial electrical-wiring plan.

13.03 Select tools, equipment, materials, and wires to complete a job.

13.04 Install the following according to the plan and specifications, complying with appropriate electric codes:
- a. wire mold
- b. conduit, duct, and raceway systems
- c. conductors in a conduit

13.05 Describe the difference between a residential and a commercial lighting circuit.

13.06 Construct control circuits from schematics.

13.07 Describe high-voltage (over 600V) wiring requirements.

13.08 Select and install power transformers to the limit specifications of the job.

13.09 Demonstrate a knowledge of installing wiring in hazardous areas.

13.10 Apply advanced troubleshooting techniques.

13.11 Install a commercial three-phase receptacle circuit, a high-voltage signal communication circuit, and an emergency-lighting system.

13.12 Calculate commercial-service-entrance requirements.

13.13 Demonstrate a knowledge of installing the following, complying with appropriate electric codes:
- a. commercial-service entrance
- b. mobile-home-park service
- c. elevator service
- d. electrical service for a marina

14.0 DEMONSTRATE SPECIALIZED ELECTRICAL SKILLS--The student will be able to:

14.01 Construct, analyze, and troubleshoot solid-state control devices.

14.02 Measure the current and voltages in solid-state control circuits.

14.03 Demonstrate an understanding of power harmonics.

14.04 Identify and install data cables according to the plan and specifications, complying with appropriate electric codes.

14.05 Discuss fiber-optics installation requirements.

OCCUPATIONAL COMPLETION POINT - DATA CODE D
INDUSTRIAL ELECTRICIAN - Industry Title

15.0 DEMONSTRATE INDUSTRIAL CIRCUIT SKILLS--The student will be able to:

- 15.01 Set up and operate power supplies for DC circuits.
- 15.02 Construct a simple DC generator and a simple DC motor.
- 15.03 Set up and operate oscilloscopes for DC circuits.
- 15.04 Analyze, construct, and troubleshoot filter circuits.
- 15.05 Set up and operate the following for DC circuits:
  - a. frequency counters
  - b. signal generators
  - c. capacitor and inductor analyzers

16.0 DEMONSTRATE INDUSTRIAL ALTERNATING-CURRENT (AC) SKILLS--The student will be able to:

- 16.01 Identify the properties of an AC signal.
- 16.02 Identify AC sources.
- 16.03 Analyze and apply the principles of transformers to AC circuits.
- 16.04 Analyze polyphase circuits.
- 16.05 Install a simple polyphase circuit.
- 16.06 Analyze and measure AC signals using oscilloscope and function generator.
- 16.07 Analyze, construct, and troubleshoot series and parallel resonant circuits.
- 16.08 Set up and operate a simple impedance bridge for AC circuits.
- 16.09 Display and interpret waveforms.
- 16.10 Read and interpret color codes to identify resistors.
- 16.11 Analyze, construct, and troubleshoot voltage dividers (loaded and unloaded).

17.0 ELECTRONICS--The student will be able to:

- 17.01 Solve network theorem problems using Kirchoff (5 and 1), Thevenin, Norton, and Superposition.
- 17.02 Analyze and measure inductive reactance (RL) and capacitive reactance (RC).
- 17.03 Construct the following circuits, complying with the appropriate local, state, or national electric codes:
  - a. parallel and series RL circuit
  - b. RC circuit
  - c. inductive-reactance-capacitance (RLC) circuit
- 17.04 Construct, analyze, and troubleshoot AC capacitance circuits, AC inductive circuits, and polyphase circuits, according to the appropriate local, state, or national electric codes.
- 17.05 Set up and operate impedance bridges for AC circuits.
- 17.06 Connect capacitors in series/parallel in AC circuits, and compute total capacitance.
- 17.07 Develop a time-constant curve.
- 17.08 Connect inductors in series/parallel in AC circuits, and compute total inductance.

18.0 INSTALL INDUSTRIAL WIRING--The student will be able to:

18.01 Draw an industrial electrical-wiring plan.
18.02 Describe the use of high-voltage test equipment.
18.03 Describe how to test insulation.
18.04 Solder and desolder components.
18.05 Drill holes in industrial installations.
18.06 Prepare a trench for a conduit.
18.07 Backfill and compact a conduit trench.
18.08 Describe how to balance a load.

19.0 INSTALL TRANSFORMERS--The student will be able to:

19.01 Install a current transformer, complying with appropriate electric codes, and measure current flow.
19.02 Install a potential transformer, complying with appropriate electric codes, and measure voltage.
19.03 Describe the difference between dry-type, oil-filled, askarel-filled, and buck-and-boost transformers.
19.04 Install industrial single-phase and three-phase transformers.

20.0 CONNECT AND VERIFY THE OPERATION OF AC AND DC ROTATING EQUIPMENT--The student will be able to:

20.01 Explain the operation of and connect the following:
a. DC shunt motor
b. DC series motor
c. DC compound motor
d. DC separately excited shunt generator
e. DC self-excited shunt generator
f. DC compound generator
g. DC series generator
h. capacitor-start motor
i. split-phase induction motor
j. capacitor-run motor
k. universal motor
l. repulsion-start, induction-run motor
m. three-phase, wound-rotor induction motor
n. three-phase, squirrel-cage induction motor
o. three-phase, synchronous motor
p. three-phase alternator
q. generator station
r. gear-motor station

20.02 Troubleshoot the following:
a. DC motor
b. single-phase motor
c. three-phase motor

21.0 CONSTRUCT CONTROL CIRCUITS AND INSTALL ELECTRICAL CONTROLS AND DEVICES--The student will be able to:

21.01 Draw an elementary motor-control line diagram.
21.02 Install the following:

a. automatic motor-control station
b. manual, push-button motor-control station
c. three-phase-control magnetic starter
d. two-station, push-button-control station
e. drum-switch-control station
f. forward/reversing-control circuit
g. hand-off, automatic-control circuit
h. multiple push-button station
i. interlocking and reversing-control circuit
j. hand-sequence-control circuit
k. AC-reduced-voltage starter (resistance)
l. three-phase, multispeed controller
m. direct-current motor controller
n. timed-sequence control circuit
o. automatic-sequence control circuit

21.03 Install the following:
a. jogging control circuit
b. plugging control circuit
c. electric braking device

21.04 Draw a ladder diagram.

21.05 Read and interpret a ladder diagram, using separate control circuits.

22.0 CONSTRUCT DC POWER SUPPLIES AND CIRCUITS--The student will be able to:

22.01 Test semiconductor devices and components.

22.02 Test circuit-protection devices.

22.03 Construct the following power supply circuits:
a. half-wave, low-voltage, power-supply circuit
b. full-wave, low-voltage, power-supply circuit
c. full-wave, low-voltage, regulated-power-supply circuit
d. full-wave, bridge-rectifier, power-supply circuit

22.04 Construct a photoelectric relay circuit.

22.05 Install solid-state, motor-control systems.

22.06 Demonstrate a knowledge of speed-control circuits and systems.

23.0 CONSTRUCT BASIC-LOGIC CIRCUITS--The student will be able to:

23.01 Construct the following basic-logic circuits:
a. NOR gate circuit
b. OR gate circuit
c. logic counter circuit
d. logic addition and subtraction circuit
e. logic multiplication and division circuit
f. logic memory circuit
g. AND gate circuit
h. NAND gate circuit

23.02 Convert decimal numbers to:
a. hexadecimal numbers
b. binary numbers
c. octal numbers

23.03 Solve problems using Boolean algebra.

23.04 Describe the function of a programmable controller.

23.05 Discuss the installation of a programmable controller.

23.06 Write and troubleshoot a program for a PLC.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8727201[illegible]
Course Title: Electricity 1
Course Credit: 1

COURSE DESCRIPTION:

This course enables students to develop the essential competencies for working in the construction electrical industry. These competencies include safety practices, direct-current electrical-circuit skills, appropriate communication and math skills, basic electricity and electric codes, and employability skills.

01.0 IDENTIFY SAFE WORKING CONDITIONS AT THE LABORATORY AND WORKPLACE, AND OBSERVE SAFETY PRECAUTIONS--The student will be able to:

- 01.01 Clean the work area and maintain it in a safe condition.
- 01.02 Apply lab policies and procedures for safety, including fire safety.
- 01.03 Identify and operate workplace-safety electrical devices.

02.0 DEMONSTRATE AN UNDERSTANDING OF BASIC DIRECT-CURRENT (DC) ELECTRICAL CIRCUIT SKILLS--The student will be able to:

- 02.01 Define the terms "voltage," "current," "resistance," "power," and "energy."
- 02.02 Measure voltage, amperage, and resistance, using a volt-ohm meter (VOM) and a digital volt-ohm meter (DVM).
- 02.03 Analyze, construct, and troubleshoot a series, series-parallel, and parallel circuit.

03.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 03.01 Ask and answer questions coherently and concisely.
- 03.02 Read and follow written instructions and listen to and follow oral instructions.
- 03.03 Give reports orally and in writing.

04.0 APPLY ELECTRICITY-RELATED BASIC MATH--The student will be able to:

- 04.01 Solve basic-math problems related to electrical work.
- 04.02 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
- 04.03 Measure tolerances on horizontal and vertical surfaces, using millimeters, centimeters, feet, and inches.
- 04.04 Convert units of measurement between the English system and the metric system.

05.0 DEMONSTRATE AN UNDERSTANDING OF BASIC ELECTRICITY--The student will be able to:

05.01 Explain the principles of electromagnetism.
05.02 Explain the magnetic properties of circuits and devices.
05.03 Relate electricity to the nature of matter.
05.04 Describe various ways that electricity is produced.

06.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

06.01 Conduct a job search and identify career-growth and advanced-training opportunities, including apprenticeship programs.
06.02 Secure information about a job.
06.03 Identify documents that may be required for a job application.

07.0 READ AND INTERPRET BASIC ELECTRIC CODES--The student will be able to:

07.01 Describe the importance of following the local, state, and national electric codes.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 87272020
Course Title: Electricity 2
Course Credit: 1

COURSE DESCRIPTION:

This course enables students to develop competencies related to safety practices, the direct-current electrical circuit, communication, math applications, electric codes, and employability skills.

01.0 IDENTIFY SAFE WORKING CONDITIONS AT THE LABORATORY AND WORKPLACE, AND OBSERVE SAFETY PRECAUTIONS--The student will be able to:

- 01.04 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 01.05 Demonstrate procedures for disaster situations.
- 01.06 Demonstrate the proper use and care of hand and power tools and equipment.
- 01.07 Describe service-truck maintenance and loading procedures.

02.0 DEMONSTRATE AN UNDERSTANDING OF BASIC DIRECT-CURRENT (DC) ELECTRICAL CIRCUIT SKILLS--The student will be able to:

- 02.04 Draw each type of circuit and calculate the circuit values.
- 02.05 Explain and apply Ohm's Law.
- 02.06 Compute conductance and resistance of conductors and insulators.

03.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 03.04 Read critically in order to recognize assumptions and implications and to evaluate ideas.
- 03.05 Find job-related information in technical literature such as a manufacturer's manual.
- 03.06 Read and interpret the graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 03.07 Write logical and understandable statements or phrases to accurately fill out forms/invoices commonly used in business and industry.

04.0 APPLY ELECTRICITY-RELATED BASIC MATH--The student will be able to:

- 04.05 Use scientific notation.
- 04.06 Demonstrate proficiency with a calculator.

05.0 DEMONSTRATE AN UNDERSTANDING OF BASIC ELECTRICITY--The student will be able to:

05.05 Explain molecular action as a result of temperature extremes, chemical reaction, and moisture content.
05.06 Draw conclusions or make inferences from data.
05.07 Produce voltage by chemical means, mechanical means, thermal means, and photoelectric means.
05.08 Identify blueprint symbols.

06.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

06.04 Complete a job-application form.
06.05 Demonstrate competence in job-interview techniques.
06.06 Demonstrate productive work habits and positive attitudes.
06.07 Demonstrate a knowledge of how to make job changes appropriately.
06.08 Identify ethical practices and responsibilities.
06.09 Demonstrate acceptable personal and professional hygiene.

07.0 READ AND INTERPRET BASIC ELECTRIC CODES--The student will be able to:

07.02 Read and interpret basic electric codes, wiring plans, and specifications.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8727203?
Course Title: Electricity 3
Course Credit: 1

COURSE DESCRIPTION:

This course provides students with an in-depth knowledge of safety practices, the direct-current electrical circuit, appropriate communication and math skills, electric codes, employability skills, entrepreneurship, and customer-relations skills.

01.0 IDENTIFY SAFE WORKING CONDITIONS AT THE LABORATORY AND WORKPLACE, AND OBSERVE SAFETY PRECAUTIONS--The student will be able to:

- 01.08 Identify rigging procedures, including hand signals.
- 01.09 Organize storage areas on site.
- 01.10 Demonstrate a knowledge of CPR (cardiopulmonary resuscitation) and first aid.

02.0 DEMONSTRATE AN UNDERSTANDING OF BASIC DIRECT-CURRENT (DC) ELECTRICAL-CIRCUIT SKILLS--The student will be able to:

- 02.07 Discuss motor theory and operation.
- 02.08 Discuss generator theory and operation.

03.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 03.08 Communicate job-related information with other trades.
- 03.09 Demonstrate appropriate telephone communication skills.
- 03.10 Identify the parts and functions of a computer system.
- 03.11 Identify the uses of the computer, including applications of the computer in the school, home, and business.
- 03.12 Perform computer activities by preparing documents with the use of word-processing or database-applications software.

04.0 APPLY ELECTRICITY-RELATED BASIC MATH--The student will be able to:

- 04.07 Solve basic algebraic formulas related to electricity.
- 04.08 Solve basic trigonometric functions related to electrical wiring.

06.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 06.10 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
- 06.11 Explain the importance of taking pride in the quality of work performed.

06.12 Describe the importance of a drug-free workplace and the industry's policies toward drug use.

06.13 Describe the ramifications of a poor driving record on employability opportunities, and maintain a good driver's record.

06.14 Describe "Florida's Right-to-Know" Law as recorded in Florida Statutes, Chapter 442.

07.0 READ AND INTERPRET BASIC ELECTRIC CODES--The student will be able to:

07.03 Identify licensure requirements for electrical occupations.

08.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

08.01 Define "entrepreneurship."

08.02 Describe the importance of entrepreneurship to the American economy and the role of small business in the free-enterprise system.

08.03 List the advantages and disadvantages of business ownership.

08.04 Identify the risks involved in the ownership of a business.

08.05 Identify the personal characteristics of a successful entrepreneur.

08.06 Identify the business skills (including computer skills) needed to operate a small business efficiently and effectively.

09.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

09.01 Exercise self-control.

09.02 Identify and demonstrate appropriate responses to criticism.

09.03 Recognize basic human-relations skills as they relate to success in the electrical industry.

09.04 Resolve customer complaints in a positive, professional manner.

09.05 Demonstrate respect for customer property by cleaning the work area after duties are completed.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8727204?
Course Title: Residential Electricity 4
Course Credit: 1

COURSE DESCRIPTION:

This course enables students to develop the competencies needed for employment in the residential electrical industry. These competencies include electrical math, alternating-current circuit, and troubleshooting residential electric circuits.

10.0 DEMONSTRATE PROFICIENCY IN ELECTRICAL MATH SKILLS--The student will be able to:

- 10.01 Calculate pressure measurement in terms of pounds per square inch (PSI) of mercury and bars.
- 10.02 Calculate wiring costs.

11.0 DEMONSTRATE ALTERNATING-CURRENT (AC) CIRCUIT SKILLS--The student will be able to:

- 11.01 Identify the physical and electrical characteristics of capacitors and inductors.
- 11.02 Demonstrate proficiency in measuring, testing, and connecting a transformer.
- 11.03 Set up and utilize a watt-hour meter.
- 11.04 Apply the principles of transformers to AC circuits.
- 11.05 Connect, analyze, and troubleshoot power and control transformers according to the appropriate local, state, or national electric codes.

12.0 INSTALL RESIDENTIAL WIRING--The student will be able to:

- 12.01 Troubleshoot residential electric circuits.
- 12.02 Drill holes in metal, wood, and concrete for electrical wiring.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 87272050
Course Title: Residential Electricity 5
Course Credit: 1

COURSE DESCRIPTION:

This course enables students to develop competencies in the installation of residential wiring.

12.0 INSTALL RESIDENTIAL WIRING--The student will be able to:

- 12.03 Identify and select tools, equipment, materials, and wires to complete a job.
- 12.04 Lay out electrical devices, complying with regulations.
- 12.06 Operate portable power generators.
- 12.07 Identify residential-wiring requirements and specifications in accordance with a wiring plan.
- 12.08 Draw a residential wiring plan, using electrical-wiring symbols.
- 12.09 Identify and install a recessed lighting fixture, a fluorescent lighting fixture, and a surface lighting fixture according to the specifications, complying with the appropriate local, state, or national electric codes.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8727206?
Course Title: Residential Electricity 6
Course Credit: 1

COURSE DESCRIPTION:

This course provides students with an in-depth knowledge of the installation of residential wiring.

12.0 INSTALL RESIDENTIAL WIRING--The student will be able to:

12.05 Install the following, complying with the appropriate local, state, or national electric codes:
- a. conductors and cable
- b. standard outlets and switch boxes
- c. cords on major appliances
- d. switches, receptacles, and dimmers, including a single-pole switched lighting circuit, a three-way switched lighting circuit, and a four-way combination circuit.

12.10 Identify, install, and wire a space-heating circuit, duplex-receptacle-outlet circuit, a split-circuit duplex-receptacle-outlet circuit, and a special-purpose receptacle-outlet circuit according to the specifications, complying with the appropriate local, state, or national electric codes.

12.11 Install and wire a low-voltage signal system.

12.12 Install conduit systems.

12.13 Provide power for heating, ventilation, and air-conditioning equipment.

12.14 Install the following, complying with the appropriate local, state, or national electric codes:
- a. service-entrance main panel
- b. service-entrance meter base
- c. remote-control lighting circuit
- d. alarm system/smoke detectors

12.15 Demonstrate a knowledge of the requirements for the installation of a swimming-pool electrical system.

12.16 Connect single-phase and three-phase transformers.

Program: 87272000 Electricity

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 87272070
Course Title: Commercial Electricity 7
Course Credit: 1

COURSE DESCRIPTION:

This course enables students to develop competencies for commercial wiring installation.

13.0 INSTALL COMMERCIAL WIRING--The student will be able to:

13.01 Read and interpret a commercial wiring plan and specifications.
13.02 Draw a commercial electrical-wiring plan.
13.03 Select tools, equipment, materials, and wires to complete a job.
13.04 Install the following according to the plan and specifications, complying with appropriate electric codes:
a. wire mold
b. conduit, duct, and raceway systems
c. conductors in a conduit
13.05 Describe the difference between a residential and a commercial lighting circuit.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8727080
Course Title: Commercial Electricity 8
Course Credit: 1

COURSE DESCRIPTION:

This course enables students to develop competencies for commercial wiring installation.

13.0 INSTALL COMMERCIAL WIRING--The student will be able to:

13.06 Construct control circuits from schematics.
13.07 Describe high-voltage (over 600V) wiring requirements.
13.08 Select and install power transformers to the limit specifications of the job.
13.09 Demonstrate a knowledge of installing wiring in hazardous areas.
13.10 Apply advanced troubleshooting techniques.
13.11 Install a commercial three-phase receptacle circuit, a high-voltage signal communication circuit, and an emergency-lighting system.
13.12 Calculate commercial-service-entrance requirements.
13.13 Demonstrate a knowledge of installing the following, complying with appropriate electric codes:
a. commercial-service entrance
b. mobile-home-park service
c. elevator service
d. electrical service for a marina

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 87272090
Course Title: Commercial Electricity 9
Course Credit: 1

COURSE DESCRIPTION:

This course provides students with an in-depth knowledge of commercial wiring installation.

14.0 DEMONSTRATE SPECIALIZED ELECTRICAL SKILLS--The student will be able to:

- 14.01 Construct, analyze, and troubleshoot solid-state control devices.
- 14.02 Measure the current and voltages in solid-state control circuits.
- 14.03 Demonstrate an understanding of power harmonics.
- 14.04 Identify and install data cables according to the plan and specifications, complying with appropriate electric codes.
- 14.05 Discuss fiber-optics installation requirements.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Electromechanical Technology
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I150403**
CIP Number	0615.040300
Grade Level	30, 31
Length	960 hours
Certification	TEC MECH @7 G
	TEC ELEC @7 G
	ELECTRONIC @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as electronic precision assemblers (93114676), electromechanical technicians (710.281-018). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content includes, but is not limited to the following: operation, maintenance and repair of electrical motors and control panels, hydraulic systems, pneumatic systems, laser electro-optic systems, mechanical drives and conveyor systems, computers, communications equipment and robotic systems.

The course content should also include training in communication, leadership, human relations, employability skills, and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Electromechanical industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students will use various types of precision test equipment for analyzing, troubleshooting and repairing electromechanical equipment.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for

each student: a training plan signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; and a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

Electronic Technology and/or Electronic Engineering Technology are prerequisites for entry into this electronic specialization. Algebra is recommended as a prerequisite for entry into this program.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 10.0, Language 9.0, Reading 10.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 960 hours in addition to completion of Electronics Technology which is the appropriate common core.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in electronic and mechanical blueprint reading.
02.0 Demonstrate proficiency in electronic communications circuits.
03.0 Demonstrate proficiency in advanced microprocessors.
04.0 Demonstrate proficiency in computer software applications.
05.0 Demonstrate proficiency in motors and motor control circuits.
06.0 Demonstrate proficiency in laser electro-optics.
07.0 Demonstrate proficiency in hydraulic and pneumatic systems.
08.0 Demonstrate proficiency in mechanical power transmission systems.
09.0 Demonstrate proficiency in mechanisms, linkages and levers.
10.0 Demonstrate proficiency in transducers and instrumentation.
11.0 Demonstrate proficiency in video systems.
12.0 Demonstrate proficiency in statics and industrial materials.
13.0 Demonstrate proficiency in automatic controls and robotics.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Electromechanical Technology
Secondary Number:
Postsecondary Number: I150403

01.0 DEMONSTRATE PROFICIENCY IN ELECTRONIC AND MECHANICAL BLUEPRINT READING--The student will be able to:

- 01.01 Describe types of blueprints and their applications.
- 01.02 Read drawings and transfer measurements.
- 01.03 Identify, use and understand application of auxiliary views, revolutions, sectional views and orthographic projections.
- 01.04 Apply dimensioning practices and techniques to drawings.
- 01.05 Apply X-Y coordinate dimensioning.
- 01.06 Apply geometric dimensioning and tolerancing procedures.
- 01.07 Identify symbols used to represent materials and standard fits.
- 01.08 Interpret mechanical production blueprints and assembly drawings.
- 01.09 Trace a circuit through a multilayer board.

02.0 DEMONSTRATE PROFICIENCY IN ELECTRONIC COMMUNICATIONS CIRCUIT--The student will be able to:

- 02.01 Construct and analyze Amplitude Modulated (AM) circuits.
- 02.02 Construct and analyze Frequency Modulated (FM) circuits.
- 02.03 Define radio propagation, antennas and transmission lines.

03.0 DEMONSTRATE PROFICIENCY IN ADVANCED MICROPROCESSORS--The student will be able to:

- 03.01 Identify the characteristics and functions of advanced microprocessor chips.
- 03.02 Analyze programs for advanced microprocessors using machine languages.
- 03.03 Identify diagnostic troubleshooting equipment on advanced microprocessor systems.
- 03.04 Describe the operation and applications of synchronous and asynchronous devices, interface adapters and timer modules.
- 03.05 Analyze the basic architecture of a typical microcomputer system, and describe the types of input and output storage methods used.
- 03.06 Analyze and program MPU's (Micro Processing Unit) using subroutines and interrupts.
- 03.07 Interface advanced peripheral devices.
- 03.08 Describe the operation of data communications systems.
- 03.09 Identify the components of data communications systems.
- 03.10 Describe and define data communication codes, formats and protocols.
- 03.11 Identify serial and parallel ports and explain their use.
- 03.12 Set up and operate modems.
- 03.13 Analyze and troubleshoot basic modems.

03.14 Identify and describe types of carrier systems.
03.15 Interconnect systems using the RS-232, RS-422 and IEEE488 interface standards.
03.16 Identify and define base band and broad band local area networks.

04.0 DEMONSTRATE PROFICIENCY IN COMPUTER SOFTWARE APPLICATIONS--The student will be able to:

04.01 Identify the major types of industrial software languages currently in use.
04.02 Load and run various types of software programs in a micro computer.
04.03 Utilize diagnostic software to troubleshoot malfunctions.
04.04 Identify and utilize various software packages.
04.05 Execute applicable software packages.

05.0 DEMONSTRATE PROFICIENCY IN MOTORS AND MOTOR CONTROL CIRCUITS--The student will be able to:

05.01 Identify and locate reference documents for the National Electric Code and other electrical standards.
05.02 Identify types of relays and describe their operation and applications.
05.03 Identify types of electric motors and describe their operation and applications of protection circuits.
05.04 Identify types of transformers and describe their operation and applications.
05.05 Identify types of motor controllers and describe their operation and applications.
05.06 Interpret relay ladder logic diagrams.
05.07 Construct manual motor starting and reversing circuits.
05.08 Construct magnetic motor starting and reversing circuits.
05.09 Construct and troubleshoot relay logic circuits.
05.10 Identify the basic elements of solid state motor control.
05.11 Analyze and construct basic transformer configurations.
05.12 Analyze and troubleshoot variable frequency drives and synchronous systems.
05.13 Analyze and troubleshoot brushless DC motor controls.
05.14 Construct and troubleshoot timing control circuits.
05.15 Identify power distribution systems.
05.16 Analyze and construct photoelectric and proximity sensor circuits.
05.17 Identify, analyze and program programmable logic controllers (PLC).

06.0 DEMONSTRATE PROFICIENCY IN LASER ELECTRO-OPTICS--The student will be able to:

06.01 Identify safety hazards and regulations of laser applications.
06.02 Define, calculate and measure the properties of laser light.
06.03 Define the elements of a basic lasing system.
06.04 Identify and define types and classes of lasers.
06.05 Define the fundamental laws of optics.

06.06 Identify and define the function of laser accessories.
06.07 Analyze and define common laser applications.
06.08 Analyze and measure laser outputs.
06.09 Align and adjust laser systems for specific outputs.
06.10 Define the use of electro-optic modulators and mechanical beam deflectors.
06.11 Measure the characteristics of electro-optic emitters and detectors.
06.12 Identify electro-optic principles.
06.13 Construct circuits for electro-optic light sources.
06.14 Construct and troubleshoot electro-optic display circuits.
06.15 Construct circuits for light reactive devices.
06.16 Measure light transmission through fiber optic devices.

07.0 DEMONSTRATE PROFICIENCY IN HYDRAULIC AND PNEUMATIC SYSTEMS--The student will be able to:

07.01 Identify the components of hydraulic systems and describe their functions.
07.02 Construct and troubleshoot basic hydraulic circuits.
07.03 Identify hydraulic symbols, components and types of fluids.
07.04 Construct and troubleshoot hydraulic circuits using flow control valves, pressure valves and sequence valves.
07.05 Construct and troubleshoot hydraulic circuits using directional and slow control valves.
07.06 Analyze, construct and troubleshoot hydraulic circuits that utilize actuator speed control and counter balance devices.
07.07 Construct and troubleshoot hydraulic circuits using reducing and unloading valves.
07.08 Construct and troubleshoot hydraulic circuits using accumulators.
07.09 Construct and troubleshoot a regenerative hydraulic circuit and a hydraulic circuit using remote control.
07.10 Construct and troubleshoot hydraulic circuits for deceleration and braking.
07.11 Identify the components of pneumatic systems and describe their functions.
07.12 Troubleshoot and repair pneumatic valves, compressors, pumps and regulators.
07.13 Analyze and define gas pressure storage and force in basic pneumatic circuits.
07.14 Construct and troubleshoot pneumatic circuits and systems.

08.0 DEMONSTRATE PROFICIENCY IN MECHANICAL POWER TRANSMISSION SYSTEMS--The student will be able to:

08.01 Utilize precision measuring instruments.
08.02 Construct and align mechanisms to demonstrate displacement, velocity and torque ratios.
08.03 Identify, analyze and repair compound and reverted gear trains.
08.04 Identify, analyze and repair internal and planetary gear trains.
08.05 Identify, analyze and repair helical and bevel gear trains.

08.06 Identify, analyze and repair rack and pinion, worm and wheel and block and screw mechanisms.
08.07 Identify, analyze and repair counter rotating mechanisms and differentials.
08.08 Identify, analyze and repair spring mechanisms, pulley blocks and differential hoists.
08.09 Identify, analyze and repair chain, belt and disc drives and universal joints.
08.10 Identify, analyze and repair clutch and coupling mechanisms.
08.11 Identify, analyze and repair bushings and cams.
08.12 Apply proper lubrication to mechanical system components.

09.0 DEMONSTRATE PROFICIENCY IN MECHANISMS, LINKAGES AND LEVERS--The student will be able to:

09.01 Identify, analyze and repair clutch and brake mechanisms.
09.02 Identify, analyze and repair class one, two, three and compound levers.
09.03 Identify, analyze and repair rocker arm and bell crank linkages and combined mechanisms.
09.04 Identify, analyze and repair four-bar mechanisms (crank, rocker and double rocker).
09.05 Identify, analyze and repair drag link and intermediate mechanisms.
09.06 Identify, analyze and repair four-bar variations.
09.07 Identify, analyze and repair cam mechanisms.
09.08 Identify, analyze and repair pivoted follower mechanisms.
09.09 Identify, analyze and repair toggle, quick return and ratchet mechanisms.
09.10 Identify, analyze and repair harmonic drives.
09.11 Identify, analyze and repair geneva mechanisms.

10.0 DEMONSTRATE PROFICIENCY IN TRANSDUCERS AND INSTRUMENTATION--The student will be able to:

10.01 Measure fluid flow and liquid levels with transducer circuits.
10.02 Utilize operational amplifier circuits for transducer applications.
10.03 Construct and utilize circuits for thermal sensing devices.
10.04 Set up and test strain gage circuits.
10.05 Utilize pressure transducers to monitor hydraulic and pneumatic circuits.
10.06 Utilize acceleration transducers.
10.07 Utilize positional transducers.
10.08 Construct and troubleshoot circuits for sound transducers.
10.09 Set up and operate transducer recording devices.

11.0 DEMONSTRATE PROFICIENCY IN VIDEO SYSTEMS--The student will be able to:

11.01 Define the principles of video signal generation and video graphics.
11.02 Analyze and troubleshoot monitor power supplies.
11.03 Analyze and troubleshoot sweep circuits.
11.04 Analyze and troubleshoot high voltage circuits.

11.05 Analyze and troubleshoot video circuits.
11.06 Analyze and troubleshoot sync circuits.
11.07 Align color monitors for proper operation.
11.08 Analyze and troubleshoot video monitor sound circuits.
11.09 Analyze and troubleshoot color circuits.
11.10 Interconnect video system components using coaxial cables.

12.0 DEMONSTRATE PROFICIENCY IN STATICS AND INDUSTRIAL MATERIALS--The student will be able to:

12.01 Define and measure forces and loads in structures using a ring force transducer.
12.02 Define and analyze force systems acting on beams.
12.03 Define and measure the mechanical properties, tensile strength, modules of elasticity and hardness of materials.
12.04 Define and measure the effects of heat treating and aging on the properties of materials (Rockwell, Brinell, tensile testing).
12.05 Identify the effects of corrosion and electroplating on materials.
12.06 Define the properties of plastic materials.

13.0 DEMONSTRATE PROFICIENCY IN AUTOMATIC CONTROLS AND ROBOTICS--The student will be able to:

13.01 Utilize complex motor control circuits including variable frequency drives.
13.02 Analyze and interpret complex ladder diagrams.
13.03 Analyze the operation of programmable controllers in robotic systems.
13.04 Develop programs for programmable controllers in an automated work cell.
13.05 Specify and utilize various sensor devices.
13.06 Analyze the operation of robotic work cells and support equipment.
13.07 Analyze and troubleshoot specific robot systems.
13.08 Analyze and implement robotic software programs, and explain pendant operations.
13.09 Interface robot systems with other automatic equipment.
13.10 Troubleshoot and repair automation control systems.
13.11 Identify and analyze various robotic motor systems.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Electronic System Assembly
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	N/A

	Secondary	PSAV
Program Numbers:	**8730300**	**I470129**
CIP Number	0647.019903	0647.019903
Grade Level	9-12, 30, 31	30, 31
Length	3 Credits	450 Hours
Certification	ELECTRICAL @7 G TEC ELEC @7 G	ELECTRICAL @7 G TEC ELEC @7 G
Facility Code	245	
VSO	VICA	
Coop Method	Yes	
Apprenticeship	Yes	
Basic Skills		
Math		9
Language		8
Reading		8

I. **PURPOSE:** The purpose of this program is to prepare students for employment as an electrical, electronic assembler (93114670), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, blueprint reading, selection and use of tools/materials, wire preparation for soldering, soldering skills, types of circuit boards, types of terminals, types of solder cups, component assembly, and solderless connections.

Listed below are the courses that comprise this program when offered at the secondary level:

8730310 - Electronic System Assembly 1
8730320 - Electronic System Assembly 2
8730330 - Electronic System Assembly 3

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Electronic System industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in electronic chassis assembly. The tools, materials and processes used in the laboratory should be similar to those used in industry.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc. is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational student organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

Planned and supervised instructional activities must be provided through one or more of the following: (1) directed laboratory experience (2) student projects (3) placement for experience (4) cooperative experience.

The cooperative method of (OJT) may be utilized for this program Whenever the cooperative method is offered, the following is required for each student: (1) A training plan signed by the student, teacher and employer that includes instructional objectives and a list of on-the-job and in-school learning experiences; (2) A work station that reflects equipment, skills and tasks that are relevant to the occupations that the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade levels required for this postsecondary adult vocational program is: Mathematics 9.0, Language 8.0, Reading 8.0, in order for students to exit the program or the occupational completion points within the program. These grade level numbers correspond to a grade equivalent score obtained on one of the state designated basic skills examinations. If a student does not meet the basic skills level required for completion from the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) laboratory or prior to admission in an Adult Basic Education (ABE) setting.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

When a student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards which the student must master to earn credit must be specified in the student's Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

SCANS Competencies: Instructional strategies for this program must include methods that require students to identify, organize and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate the methods to improve students' personal qualities and high-order thinking skills.

The typical length of this program for the average achieving student is 450 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A

ELECTRICAL, ELECTRONIC ASSEMBLER - OES Code 93114670

01.0 Demonstrate proficiency in interpreting written, graphic and/or oral instruction.
02.0 Demonstrate proficiency in developing basic electronic assembly skills.
03.0 Demonstrate proficiency in preparing wire for soldering and/or assembly.
04.0 Demonstrate proficiency in applying soldering techniques.
05.0 Demonstrate proficiency in connecting component and lead wires.
06.0 Demonstrate proficiency in installing electronic component assembly.
07.0 Demonstrate proficiency in preparing material for solderless connections.
08.0 Demonstrate proficiency in appropriate communication skills.
09.0 Demonstrate proficiency in appropriate math skills.
10.0 Demonstrate proficiency in appropriate understanding of basic science.
11.0 Demonstrate proficiency in employability skills.
12.0 Demonstrate proficiency in understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Electronic System Assembly
Secondary Number: 8730300
Postsecondary Number: I470129

OCCUPATIONAL COMPLETION POINT - DATA CODE A
ELECTRICAL, ELECTRONIC ASSEMBLER - OES Code 93114670

01.0 DEMONSTRATE PROFICIENCY IN INTERPRETING WRITTEN, GRAPHIC AND/OR ORAL INSTRUCTION--The student will be able to:

- 01.01 Read and interpret written and oral instructions.
- 01.02 Read and interpret graphic instructions.
- 01.03 Follow accepted safety rules.
- 01.04 Read and interpret electronic chassis assembly.
- 01.05 Read and interpret color coding.

02.0 DEMONSTRATE PROFICIENCY IN DEVELOPING BASIC ELECTRONIC ASSEMBLY SKILLS--The student will be able to:

- 02.01 Use hand tools.
- 02.02 Use mechanical and other strippers.
- 02.03 Use soldering irons.
- 02.04 Select soldering materials.
- 02.05 Select types of wire.
- 02.06 Identify and select electronic component parts.
- 02.07 Select types of terminals.
- 02.08 Select types of cleaning tools and materials.
- 02.09 Use desoldering tools.

03.0 DEMONSTRATE PROFICIENCY IN PREPARING WIRE FOR SOLDERING AND/OR ASSEMBLY--The student will be able to:

- 03.01 Strip wires for soldering.
- 03.02 Tin by hand and/or solder pot.

04.0 DEMONSTRATE PROFICIENCY IN APPLYING SOLDERING TECHNIQUES--The student will be able to:

- 04.01 Apply heat applications.
- 04.02 Apply solder applications.
- 04.03 Rework unsatisfactory connectors.
- 04.04 Maintain solder connection appearance.

05.0 DEMONSTRATE PROFICIENCY IN CONNECTING COMPONENT AND LEAD WIRES--The student will be able to:

- 05.01 Solder component leads to printed circuit boards.
- 05.02 Solder component lead wires to turret terminals.
- 05.03 Solder lead wires to bifurcated terminals.
- 05.04 Solder lead wires to hook and perforated terminals.

05.05 Solder lead wires into connector solder cups.

06.0 DEMONSTRATE PROFICIENCY IN INSTALLING ELECTRONIC COMPONENT ASSEMBLY--The student will be able to:

06.01 Mount components onto a chassis.
06.02 Mount components onto a panel.
06.03 Mount components onto a circuit board.

07.0 DEMONSTRATE PROFICIENCY IN PREPARING MATERIALS FOR SOLDERLESS CONNECTIONS--The student will be able to:

07.01 Prepare wire for cables.
07.02 Strip, terminalize, lay and lace harness.
07.03 Use heat shrinkable tubing.
07.04 Strip wires for wrapping.
07.05 Route and wrap for pin connections.

08.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

08.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
08.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
08.03 Read and follow written and oral instructions.
08.04 Answer and ask questions coherently and concisely.
08.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
08.06 Demonstrate appropriate telephone/communication skills.

09.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE MATH SKILLS--The student will be able to:

09.01 Read and interpret measuring devices (rules and tapes).
09.02 Add 100 addition combinations.
09.03 Add two-digit numbers.
09.04 Add three-digit numbers.
09.05 Subtract 100 subtraction combinations.
09.06 Subtract two-, three- and four-digit numbers.
09.07 Solve one-digit divisor problems.
09.08 Solve two-digit divisor problems.
09.09 Solve two- and three-digit divisor problems.
09.10 Solve multiplication facts.
09.11 Multiply by a one-digit factor.
09.12 Multiply by a two-digit factor.
09.13 Identify the parts of a fraction.
09.14 Solve fractional word problems.
09.15 Classify types of fractions.
09.16 Illustrate equivalent fractions.
09.17 Convert fractions.
09.18 Reduce fractions.
09.19 Solve decimal notations.

09.20 Solve number word problems.
09.21 Round to the nearest whole number.
09.22 Add decimals.
09.23 Subtract decimals.
09.24 Multiply decimals.
09.25 Divide a decimal by a decimal.
09.26 Divide a whole number by a decimal.
09.27 Write fractions as decimals and percents.
09.28 Write percents add fractions and decimals.
09.29 Solve percent problems.
09.30 Find the percent of a number.
09.31 Operate a calculator.
09.32 Understand and use the metric system.
09.33 Convert inches to millimeters and millimeters to inches.
09.34 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
09.35 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
09.36 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
09.37 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
09.38 Demonstrate an understanding of federal, state and local taxes and their computation.

10.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

10.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
10.02 Draw conclusions or make inferences from data.
10.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
10.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

11.0 DEMONSTRATE PROFICIENCY IN EMPLOYABILITY SKILLS--The student will be able to:

11.01 Conduct a job search.
11.02 Secure information about a job.
11.03 Identify documents which may be required when applying for a job interview.
11.04 Complete a job application form correctly.
11.05 Demonstrate competence in job interview techniques.
11.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
11.07 Identify acceptable work habits.
11.08 Demonstrate knowledge of how to make appropriate job changes.
11.09 Demonstrate acceptable employee health habits.
11.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

12.0 DEMONSTRATE PROFICIENCY IN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

12.01 Define entrepreneurship.
12.02 Describe the importance of entrepreneurship to the American economy.
12.03 List the advantages and disadvantages of business ownership.
12.04 Identify the risks involved in ownership of a business.
12.05 Identify the necessary personal characteristics of a successful entrepreneur.
12.06 Identify the business skills needed to operate a small business efficiently and effectively.

Program: 8730300 Electronic System Assembly

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8730310
Course Title: Electronic System Assembly 1
Course Credit: 1

COURSE DESCRIPTION:

This course includes instruction in basic electronics and interpreting instructions.

01.0 DEMONSTRATE PROFICIENCY IN INTERPRETING WRITTEN, GRAPHIC AND/OR ORAL INSTRUCTION--The student will be able to:

- 01.01 Read and interpret written and oral instructions.
- 01.02 Read and interpret graphic instructions.
- 01.03 Follow accepted safety rules.
- 01.04 Read and interpret electronic chassis assembly.
- 01.05 Read and interpret color coding.

02.0 DEMONSTRATE PROFICIENCY IN DEVELOPING BASIC ELECTRONIC ASSEMBLY SKILLS--The student will be able to:

- 02.01 Use hand tools.
- 02.02 Use mechanical and other strippers.
- 02.03 Use soldering irons.
- 02.04 Select soldering materials.
- 02.05 Select types of wire.
- 02.06 Identify and select electronic component parts.
- 02.07 Select types of terminals.
- 02.08 Select types of cleaning tools and materials.
- 02.09 Use desoldering tools.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8730320
Course Title: Electronic System Assembly 2
Course Credit: 1

COURSE DESCRIPTION:

This course includes instruction in wire soldering, soldering techniques and connecting lead wires.

03.0 DEMONSTRATE PROFICIENCY IN PREPARING WIRE FOR SOLDERING AND/OR ASSEMBLY--The student will be able to:

- 03.01 Strip wires for soldering.
- 03.02 Tin by hand and/or solder pot.

04.0 DEMONSTRATE PROFICIENCY IN APPLYING SOLDERING TECHNIQUES--The student will be able to:

- 04.01 Apply heat applications.
- 04.02 Apply solder applications.
- 04.03 Rework unsatisfactory connectors.
- 04.04 Maintain solder connection appearance.

05.0 DEMONSTRATE PROFICIENCY IN CONNECTING COMPONENT AND LEAD WIRES--The student will be able to:

- 05.01 Solder component leads to printed circuit boards.
- 05.02 Solder component lead wires to turret terminals.
- 05.03 Solder lead wires to bifurcated terminals.
- 05.04 Solder lead wires to hook and perforated terminals.
- 05.05 Solder lead wires into connector solder cups.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8730330
Course Title: Electronic System Assembly 3
Course Credit: 1

COURSE DESCRIPTION:

This course includes instruction in installation of electronic components, and making solderless connections.

06.0 DEMONSTRATE PROFICIENCY IN INSTALLING ELECTRONIC COMPONENT ASSEMBLY--The student will be able to:

- 06.01 Mount components onto a chassis.
- 06.02 Mount components onto a panel.
- 06.03 Mount components onto a circuit board.

07.0 DEMONSTRATE PROFICIENCY IN PREPARING MATERIALS FOR SOLDERLESS CONNECTIONS--The student will be able to:

- 07.01 Prepare wire for cables.
- 07.02 Strip, terminalize, lay and lace harness.
- 07.03 Use heat shrinkable tubing.
- 07.04 Strip wires for wrapping.
- 07.05 Route and wrap for pin connections.

08.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 08.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 08.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 08.03 Read and follow written and oral instructions.
- 08.04 Answer and ask questions coherently and concisely.
- 08.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 08.06 Demonstrate appropriate telephone/communication skills.

09.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE MATH SKILLS--The student will be able to:

- 09.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 09.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 09.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

09.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

09.05 Demonstrate an understanding of federal, state and local taxes and their computation.

10.0 DEMONSTRATE PROFICIENCY IN APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

10.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

10.02 Draw conclusions or make inferences from data.

10.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

10.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

11.0 DEMONSTRATE PROFICIENCY IN EMPLOYABILITY SKILLS--The student will be able to:

11.01 Conduct a job search.

11.02 Secure information about a job.

11.03 Identify documents which may be required when applying for a job interview.

11.04 Complete a job application form correctly.

11.05 Demonstrate competence in job interview techniques.

11.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

11.07 Identify acceptable work habits.

11.08 Demonstrate knowledge of how to make appropriate job changes.

11.09 Demonstrate acceptable employee health habits.

11.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

12.0 DEMONSTRATE PROFICIENCY IN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

12.01 Define entrepreneurship.

12.02 Describe the importance of entrepreneurship to the American economy.

12.03 List the advantages and disadvantages of business ownership.

12.04 Identify the risks involved in ownership of a business.

12.05 Identify the necessary personal characteristics of a successful entrepreneur.

12.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Electronic Technology
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I150303**
CIP Number	0615.030300
Grade Level	30, 31
Length	1200 to 1400 hours
Certification	ELECTRONIC @7 G
	TEC ELEC @7 G
	AVIONICS @7 G

I. **MAJOR CONCEPTS/CONTENT:** The program is designed to prepare individuals for employment as electrical and electronics technicians (22505231), (003.161-014) or in related occupations in electronics, or to provide supplemental training to persons currently or previously employed in the occupation.

Course content includes the following: direct current (DC) circuits, alternating current (AC) circuits and analog circuits; solid state and digital devices; microprocessors; use of circuit diagrams and schematics; soldering and chassis assembly techniques; laboratory practices; and technical recording and reporting.

The course content also includes training in communication, leadership, human relations, employability skills, and safe efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Electronic industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Electronic laboratory activities are an integral part of this program. The tools, test equipment, materials and processes used in this laboratory are similar to those used in industry. Students should be able to use the various types of precision test equipment found in general use throughout the electronics industry for the purpose of analyzing, troubleshooting and repairing electronic circuitry.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

Algebra is recommended as a prerequisite for entry into this program.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 10.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan signed by the student, teacher and employer, which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

This program serves as the Florida common core electronics program. Content is compatible with and a prerequisite for advanced skills contained in the PSAV programs: Avionics, Communication Electronics, Computer Electronics Technology, Industrial Electronics, Laser Electro-Optic Technology and AS programs: Computer Engineering Technology, Electronics Engineering Technology, Laser Electro-Optic Engineering Technology, and Telecommunication Engineering Technology.

The typical length of this program for the average achieving student is 1200 to 1400 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in laboratory practices.
02.0 Demonstrate proficiency in direct current (DC) circuits.
03.0 Demonstrate proficiency in alternating current (AC) circuits.
04.0 Demonstrate proficiency in solid-state devices.
05.0 Demonstrate proficiency in analog circuits.
06.0 Demonstrate proficiency in digital circuits.
07.0 Demonstrate proficiency in microprocessor systems.
08.0 Demonstrate proficiency in technical recording and reporting.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate appropriate math skills.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate employability skills.
13.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Electronic Technology
Secondary Number:
Postsecondary Number: I150303

01.0 DEMONSTRATE PROFICIENCY IN LABORATORY PRACTICES--The student will be able to:

- 01.01 Apply proper Occupational Safety Health Administration (OSHA) safety standards.
- 01.02 Make electrical connections.
- 01.03 Identify and use hand tools properly.
- 01.04 Identify and use power tools properly.
- 01.05 Demonstrate acceptable soldering techniques.
- 01.06 Demonstrate acceptable desoldering techniques.
- 01.07 Demonstrate electrostatic discharge (ESD) safety procedures.
- 01.08 Describe the construction of printed circuit boards (PCB's).
- 01.09 Explain the theoretical concepts of soldering.
- 01.10 Demonstrate rework and repair techniques.
- 01.11 Demonstrate the use of a micro-computer operating system.
- 01.12 Demonstrate the use of a high level computer language.
- 01.13 Demonstrate the use of micro-computer application programs (i.e., word processing, data base and spreadsheet).

02.0 DEMONSTRATE PROFICIENCY IN DIRECT CURRENT (DC) CIRCUITS--The student will be able to:

- 02.01 Solve algebraic problems to include exponentials (prerequisite to DC).
- 02.02 Solve problems in electronic units utilizing metric prefixes.
- 02.03 Relate electricity to the nature of matter.
- 02.04 Identify sources of electricity.
- 02.05 Define voltage, current, resistance, power and energy.
- 02.06 Apply Ohm's law and power formulas.
- 02.07 Read and interpret color codes and symbols to identify electrical components and values.
- 02.08 Measure properties of a circuit using volt-ohm meter (VOM) and digital volt-ohm meter (DVM) and oscilloscopes.
- 02.09 Compute conductance and compute and measure resistance of conductors and insulators.
- 02.10 Apply Ohm's law to series circuits.
- 02.11 Construct and verify operation of series circuits.
- 02.12 Analyze and troubleshoot series circuits.
- 02.13 Apply Ohm's law to parallel circuits.
- 02.14 Construct and verify the operation of parallel circuits.
- 02.15 Analyze and troubleshoot parallel circuits.
- 02.16 Apply Ohm's law to series-parallel and parallel-series circuits.
- 02.17 Construct and verify the operation of series-parallel and parallel-series and bridge circuits.

02.18 Troubleshoot series-parallel and parallel-series and bridge circuits.
02.19 Identify and define voltage divider circuits (loaded and unloaded).
02.20 Construct and verify the operation of voltage divider circuits (loaded and unloaded).
02.21 Analyze and troubleshoot voltage divider circuits (loaded and unloaded).
02.22 Apply maximum power transfer theory.
02.23 Construct and verify the operation of DC circuits that demonstrate the maximum power transfer theory.
02.24 Describe magnetic properties of circuits and devices.
02.25 Determine the physical and electrical characteristics of capacitors and inductors.
02.26 Define resistor-capacitor (R-C) and resistor-inductor (R-L) time constants and classify the output of differentiators and integrators.
02.27 Set up and operate power supplies for DC circuits.

03.0 DEMONSTRATE PROFICIENCY IN ALTERNATING CURRENT (AC) CIRCUITS--The student will be able to:

03.01 Solve basic trigonometric problems as applicable to electronics (prerequisite to AC).
03.02 Identify properties of an AC signal.
03.03 Identify AC sources.
03.04 Analyze and measure AC signals utilizing VOM, DVM, oscilloscope, frequency counter and function generator.
03.05 Define the characteristics of AC capacitive circuits.
03.06 Construct and verify the operation of AC capacitive circuits.
03.07 Analyze and troubleshoot AC capacitive circuits.
03.08 Define the characteristics of AC inductive circuits.
03.09 Construct and verify the operation of AC inductive circuits.
03.10 Analyze and troubleshoot AC inductive circuits.
03.11 Define and apply the principles of transformers to AC circuits.
03.12 Construct and verify the operation of AC circuits utilizing transformers.
03.13 Analyze and troubleshoot AC circuits utilizing transformers.
03.14 Construct and verify the operation of differentiators and integrators to determine R-C and R-L time constraints.
03.15 Analyze and troubleshoot differentiator and integrator circuits.
03.16 Define the characteristics of resistance inductance capacitance (RLC) circuits (series, parallel and complex).
03.17 Construct and verify the operation of RLC circuits (series, parallel and complex).
03.18 Define the characteristics of series and parallel resonant circuits.
03.19 Construct and verify the operation of series and parallel resonant circuits.
03.20 Analyze and troubleshoot R-C, R-L and RLC circuits.
03.21 Define the characteristics of frequency selective filter circuits.

03.22 Construct and verify the operation of frequency selective filer circuits.
03.23 Analyze and troubleshoot frequency selective filter circuits.
03.24 Define the characteristics of polyphase circuits.
03.25 Define basic motor theory and operation.
03.26 Define basic generator theory and operation.
03.27 Set up and operate power supplies for AC circuits.
03.28 Analyze and measure power in AC circuits.
03.29 Set up and operate capacitor and inductor analyzers for AC circuits.

04.0 DEMONSTRATE PROFICIENCY IN SOLID-STATE DEVICES--The student will be able to:

04.01 Identify and define properties of semiconductor materials.
04.02 Identify and define operating characteristics and applications of junction diodes.
04.03 Identify and define operating characteristics and applications of special diodes.
04.04 Construct diode circuits.
04.05 Analyze and troubleshoot diode circuits.
04.06 Identify and define operating characteristics and applications of bipolar transistors.
04.07 Identify and define operating characteristics and applications of field effect transistors.
04.08 Identify and define operating characteristics and applications of single-stage amplifiers.
04.09 Construct single-stage amplifiers.
04.10 Analyze and troubleshoot single-stage amplifiers.
04.11 Construct thyristor circuitry.
04.12 Analyze and troubleshoot thyristor circuitry.
04.13 Set up and operate a VOM for solid-state devices.
04.14 Set up and operate a DVM for solid-state devices.
04.15 Set up and operate power supplies for solid-state devices.
04.16 Set up and operate oscilloscopes for solid-state devices.
04.17 Set up and operate function generators for solid-state devices.
04.18 Set up and operate capacitor and inductor analyzers for solid-state devices.
04.19 Set up and operate curve tracers.
04.20 Set up and operate transistor testers.

05.0 DEMONSTRATE PROFICIENCY IN ANALOG CIRCUITS--The student will be able to:

05.01 Identify and define operational characteristics and applications of multistage amplifiers.
05.02 Construct multistage amplifiers.
05.03 Analyze and troubleshoot multistage amplifiers.
05.04 Identify and define operating characteristics and applications of linear integrated circuits.
05.05 Identify and define operating characteristics and applications of basic power supplies and filters.
05.06 Construct basic power supplies and filters.
05.07 Troubleshoot basic power supplies and filters.

05.08 Identify and define operating characteristics and applications of differential and operational amplifiers.
05.09 Construct differential and operational amplifier circuits.
05.10 Analyze and troubleshoot differential and operational amplifier circuits.
05.11 Identify and define operating characteristics of audio power amplifiers.
05.12 Construct audio power amplifiers.
05.13 Analyze and troubleshoot audio power amplifiers.
05.14 Identify and define operating characteristics and applications of power supply regulator circuits.
05.15 Construct power supply regulator circuits.
05.16 Analyze and troubleshoot power supply regulator circuits.
05.17 Identify and define operating characteristics and applications of active filters.
05.18 Construct active filter circuits.
05.19 Analyze and troubleshoot active filter circuits.
05.20 Identify and define operating characteristics and applications of sinusoidal and nonsinusoidal oscillator circuits.
05.21 Construct oscillator circuits.
05.22 Analyze and troubleshoot oscillator circuits.
05.23 Identify and define operating characteristics and applications of cathode ray tubes.
05.24 Identify and define operating characteristics and applications of optoelectronic devices.
05.25 Set up and operate measuring instruments for analog circuits.

06.0 DEMONSTRATE PROFICIENCY IN DIGITAL CIRCUITS--The student will be able to:

06.01 Define and apply numbering systems to codes and arithmetic operations.
06.02 Analyze and minimize logic circuits using Boolean operations.
06.03 Set up and operate logic probes for digital circuits.
06.04 Set up and operate power supplies for digital circuits and solve power distribution and noise problems.
06.05 Set up and operate pulsers for digital circuits.
06.06 Set up and operate oscilloscopes for digital circuits.
06.07 Set up and operate logic analyzers for digital circuits.
06.08 Set up and operate pulse generators for digital circuits.
06.09 Identify types of logic gates and their truth tables.
06.10 Construct combinational logic circuits using integrated circuits.
06.11 Troubleshoot logic circuits.
06.12 Analyze types of flip-flops and their truth tables.
06.13 Construct flip-flops using integrated circuits.
06.14 Troubleshoot flip-flops.
06.15 Identify, define and measure characteristics of integrated circuit (IC) logic families.
06.16 Identify types of registers and counters.
06.17 Construct registers and counters using flip-flops and logic gates.
06.18 Troubleshoot registers and counters.
06.19 Analyze clock and timing circuits.

06.20 Construct clock and timing circuits.
06.21 Troubleshoot clock and timing circuits.
06.22 Identify types of arithmetic-logic circuits.
06.23 Construct arithmetic-logic circuits.
06.24 Troubleshoot arithmetic-logic circuits.
06.25 Identify types of encoding and decoding devices.
06.26 Construct encoders and decoders.
06.27 Troubleshoot encoders and decoders.
06.28 Identify types of multiplexer and demultiplexer circuits.
06.29 Construct multiplexer and demultiplexer circuits using integrated circuits.
06.30 Troubleshoot multiplexer and demultiplexer circuits.
06.31 Identify types of memory circuits.
06.32 Relate the uses of digital-to-analog and analog-to-digital conversions.
06.33 Construct digital-to-analog and analog-to-digital circuits.
06.34 Troubleshoot digital-to-analog and analog-to-digital circuits.
06.35 Identify types of digital displays.
06.36 Construct digital display circuits.
06.37 Troubleshoot digital display circuits.

07.0 DEMONSTRATE PROFICIENCY IN MICROPROCESSOR SYSTEMS--The student will be able to:

07.01 Identify central processing unit (CPU) building blocks and their uses (architecture).
07.02 Analyze bus concepts.
07.03 Analyze various memory schemes.
07.04 Use memory devices in circuits.
07.05 Troubleshoot memory device circuits.
07.06 Set up and operate oscilloscopes for microprocessor systems.
07.07 Set up and operate logic-data analyzers to troubleshoot microprocessor systems.
07.08 Identify types of input and output devices and peripherals.
07.09 Interface input and output ports to peripherals.
07.10 Analyze and troubleshoot input and output ports.
07.11 Write a computer program in assembly language.
07.12 Write a computer program in machine language.
07.13 Execute computer instruction sets.

08.0 DEMONSTRATE PROFICIENCY IN TECHNICAL RECORDING AND REPORTING--The student will be able to:

08.01 Draw and interpret electronic schematics.
08.02 Record data and design curves and graphs.
08.03 Write reports and make oral presentations.
08.04 Maintain test logs.
08.05 Make equipment failure reports.
08.06 Specify and requisition simple electronic components.
08.07 Compose technical letters and memoranda.
08.08 Write formal reports of laboratory experiences.
08.09 Draft preventive maintenance and calibration procedures.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Identify documents that may be required when applying for a job.
12.04 Complete a job application form correctly.
12.05 Demonstrate competence in job interview techniques.
12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
12.07 Identify acceptable work habits.
12.08 Demonstrate knowledge of how to make appropriate job changes.
12.09 Demonstrate acceptable employee health habits.
12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE PROFICIENCY IN ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.
13.05 Identify the necessary personal characteristics of a successful entrepreneur.
13.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Electronics
Occupational Area:	Industrial Education
	Secondary
Program Numbers	**8730000**
CIP Number	0647.010503
Grade Level	9-12, 30, 31
Length	6 credits
Certification	ELECTRONIC @7 G
	TEC ELEC @7 G
	RADIO TV @7 G
	AVIONICS @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as electronics repairers (85717617), Electronics Testers II (726.684-026). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content will include the following: direct current (DC) circuits, alternating current (AC) circuits and analog circuits; solid-state and digital devices; use of circuit diagrams and schematics; soldering and chassis assembly techniques and laboratory practices.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

Listed below are the courses that comprise this program when offered at the secondary level:

8730010 - Electronics 1
8730020 - Electronics 2
8730030 - Electronics 3
8730040 - Electronics 4
8730050 - Electronics 5
8730060 - Electronics 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Electronics industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, test equipment, materials and processes found in industry.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership

training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

Algebra is recommended as a prerequisite for entry into this program.

The outcomes and student performance standards which the handicapped student must master must be specified in each student's Individual Education Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in laboratory practices.
02.0 Demonstrate proficiency in direct current (DC) circuits.
03.0 Demonstrate proficiency in alternating current (AC) circuits.
04.0 Demonstrate proficiency in solid-state devices.
05.0 Demonstrate proficiency in analog circuits.
06.0 Demonstrate proficiency in digital circuits.
07.0 Demonstrate appropriate communication skills.
08.0 Demonstrate appropriate math skills.
09.0 Demonstrate appropriate understanding of basic science.
10.0 Demonstrate employability skills.
11.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Electronics
Secondary Number: 8730000
Postsecondary Number:

01.0 DEMONSTRATE PROFICIENCY IN LABORATORY PRACTICES--The student will be able to:

- 01.01 Apply proper Occupational Safety Health Administration (OSHA) safety standards.
- 01.02 Make electrical connections.
- 01.03 Identify and use hand tools properly.
- 01.04 Identify and use power tools properly.
- 01.05 Demonstrate acceptable soldering and desoldering techniques.

02.0 DEMONSTRATE PROFICIENCY IN DIRECT CURRENT (DC) CIRCUITS--The student will be able to:

- 02.01 Solve algebraic problems to include exponentials (prerequisite to DC).
- 02.02 Solve problems in electronic units utilizing metric prefixes.
- 02.03 Relate electricity to the nature of matter.
- 02.04 Identify sources of electricity.
- 02.05 Define voltage, current, resistance, power and energy.
- 02.06 Apply Ohm's law and power formulas.
- 02.07 Read and interpret color codes and symbols to identify electrical components and values.
- 02.08 Measure properties of a circuit using volt-ohm meter (VOM) and digital volt-ohm meter (DVM) meters and oscilloscopes.
- 02.09 Compute conductance and compute and measure resistance of conductors and insulators.
- 02.10 Apply Ohm's law to series circuits.
- 02.11 Construct and verify operation of series circuits.
- 02.12 Analyze and troubleshoot series circuits.
- 02.13 Apply Ohm's law to parallel circuits.
- 02.14 Construct and verify the operation of parallel circuits.
- 02.15 Analyze and troubleshoot parallel circuits.
- 02.16 Apply Ohm's law to series-parallel and parallel-series circuits.
- 02.17 Construct and verify the operation of series-parallel and parallel-series and bridge circuits.
- 02.18 Troubleshoot series-parallel and parallel-series and bridge circuits.
- 02.19 Identify and define voltage divider circuits (loaded and unloaded).
- 02.20 Construct and verify the operation of voltage divider circuits (loaded and unloaded).
- 02.21 Analyze and troubleshoot voltage divider circuits (loaded and unloaded).
- 02.22 Apply maximum power transfer theory.

02.23 Construct and verify the operation of DC circuits that demonstrate the maximum power transfer theory.
02.24 Describe magnetic properties of circuits and devices.
02.25 Determine the physical and electrical characteristics of capacitors and inductors.
02.26 Define reactive-capacitance (R-C) and inductive-reactance (R-L) time constants and classify the output of differentiators and integrators.
02.27 Set up and operate power supplies for DC circuits.

03.0 DEMONSTRATE PROFICIENCY IN ALTERNATING CURRENT (AC) CIRCUITS--The student will be able to:

03.01 Solve basic trigonometric problems as applicable to electronics (prerequisite to AC).
03.02 Identify properties of an AC signal.
03.03 Identify AC sources.
03.04 Analyze and measure AC signals utilizing VOM, DVM, oscilloscope, frequency counter and function generator.
03.05 Define the characteristics of AC capacitive circuits.
03.06 Construct and verify the operation of AC capacitive circuits.
03.07 Analyze and troubleshoot AC capacitive circuits.
03.08 Define the characteristics of AC inductive circuits.
03.09 Construct and verify the operation of AC inductive circuits.
03.10 Analyze and troubleshoot AC inductive circuits.
03.11 Define and apply the principles of transformers to AC circuits.
03.12 Construct and verify the operation of AC circuits utilizing transformers.
03.13 Analyze and troubleshoot AC circuits utilizing transformers.
03.14 Construct and verify the operation of differentiators and integrators to determine R-C and R-L time constraints.
03.15 Analyze and troubleshoot differentiator and integrator circuits.
03.16 Define the characteristics of resistance inductance capacitance (RLC) circuits (series, parallel and complex).
03.17 Construct and verify the operation of RLC circuits (series, parallel and complex).
03.18 Define the characteristics of series and parallel resonant circuits.
03.19 Construct and verify the operation of series and parallel resonant circuits.
03.20 Analyze and troubleshoot R-C, and R-L and RLC circuits.
03.21 Define the characteristics of frequency selective filter circuits.
03.22 Construct and verify the operation of frequency selective filter circuits.
03.23 Analyze and troubleshoot frequency selective filter circuits.
03.24 Define the characteristics of polyphase circuits.
03.25 Define basic motor theory and operation.
03.26 Define basic generator theory and operation.
03.27 Set up and operate power supplies for AC circuits.
03.28 Analyze and measure power in AC circuits.
03.29 Set up and operate capacitor and inductor analyzers for AC circuits.

04.0 DEMONSTRATE PROFICIENCY IN SOLID-STATE DEVICES--The student will be able to:

04.01 Identify and define properties of semiconductor materials.
04.02 Identify and define operating characteristics and applications of junction diodes.
04.03 Identify and define operating characteristics and applications of special diodes.
04.04 Construct diode circuits.
04.05 Analyze and troubleshoot diode circuits.
04.06 Identify and define operating characteristics and applications of bipolar transistors.
04.07 Identify and define operating characteristics and applications of field effect transistors.
04.08 Identify and define operating characteristics and applications of single-stage amplifiers.
04.09 Construct single-stage amplifiers.
04.10 Analyze and troubleshoot single-stage amplifiers.
04.11 Construct thyristor circuitry.
04.12 Analyze and troubleshoot thyristor circuitry.
04.13 Set up and operate a VOM for solid-state devices.
04.14 Set up and operate a DVM for solid-state devices.
04.15 Set up and operate power supplies for solid-state devices.
04.16 Set up and operate oscilloscopes for solid-state devices.
04.17 Set up and operate function generators for solid-state devices.
04.18 Set up and operate capacitor and inductor analyzers for solid-state devices.
04.19 Set up and operate curve tracers.
04.20 Set up and operate transistor testers.

05.0 DEMONSTRATE PROFICIENCY IN ANALOG CIRCUITS--The student will be able to:

05.01 Identify and define operational characteristics and applications of multistage amplifiers.
05.02 Construct multistage amplifiers.
05.03 Analyze and troubleshoot multistage amplifiers.
05.04 Identify and define operating characteristics and applications of linear integrated circuits.
05.05 Identify and define operating characteristics and applications of basic power supplies and filters.
05.06 Construct basic power supplies and filters.
05.07 Troubleshoot basic power supplies and filters.
05.08 Identify and define operating characteristics and applications of differential and operational amplifiers.
05.09 Construct differential and operational amplifier circuits.
05.10 Analyze and troubleshoot differential and operational amplifier circuits.
05.11 Identify and define operating characteristics of audio power amplifiers.
05.12 Construct audio power amplifiers.
05.13 Analyze and troubleshoot audio power amplifiers.
05.14 Identify and define operating characteristics and applications of power supply regulator circuits.

05.15 Construct power supply regulator circuits.
05.16 Analyze and troubleshoot power supply regulator circuits.
05.17 Identify and define operating characteristics and applications of active filters.
05.18 Construct active filter circuits.
05.19 Analyze and troubleshoot active filter circuits.
05.20 Identify and define operating characteristics and applications of sinusoidal and nonsinusoidal oscillator circuits.
05.21 Construct oscillator circuits.
05.22 Analyze and troubleshoot oscillator circuits.
05.23 Identify and define operating characteristics and applications of motor phase-shift control circuits (single-phase and multiphase).
05.24 Identify and define operating characteristics and applications of cathode ray tubes.
05.25 Identify and define operating characteristics and applications of optoelectronic devices.
05.26 Set up and operate measuring instruments for analog circuits.

06.0 DEMONSTRATE PROFICIENCY IN DIGITAL CIRCUITS--The student will be able to:

06.01 Define and apply numbering systems to codes and arithmetic operations.
06.02 Analyze and minimize logic circuits using Boolean operations.
06.03 Set up and operate logic probes for digital circuits.
06.04 Set up and operate power supplies for digital circuits and solve power distribution and noise problems.
06.05 Set up and operate pulsers for digital circuits.
06.06 Set up and operate oscilloscopes for digital circuits.
06.07 Set up and operate logic analyzers for digital circuits.
06.08 Set up and operate pulse generators for digital circuits.
06.09 Identify types of logic gates and their truth tables.
06.10 Construct combinational logic circuits using integrated circuits.
06.11 Troubleshoot logic circuits.
06.12 Analyze types of flip-flops and their truth tables.
06.13 Construct flip-flops using integrated circuits.
06.14 Troubleshoot flip-flops.
06.15 Identify, define and measure characteristics of integrated circuits (IC) logic families.
06.16 Identify types of registers and counters.
06.17 Construct registers and counters using flip-flops and logic gates.
06.18 Troubleshoot registers and counters.
06.19 Analyze clock and timing circuits.
06.20 Construct clock and timing circuits.
06.21 Troubleshoot clock and timing circuits.
06.22 Identify types of arithmetic-logic circuits.
06.23 Construct arithmetic-logic circuits.
06.24 Troubleshoot arithmetic-logic circuits.
06.25 Identify types of encoding and decoding devices.
06.26 Construct encoders and decoders.
06.27 Troubleshoot encoders and decoders.

06.28 Identify types of multiplexer and demultiplexer circuits.
06.29 Construct multiplexer and demultiplexer circuits using integrated circuits.
06.30 Troubleshoot multiplexer and demultiplexer circuits.
06.31 Identify types of memory circuits.
06.32 Relate the uses of digital-to-analog and analog-to-digital conversions.
06.33 Construct digital-to-analog and analog-to-digital circuits.
06.34 Troubleshoot digital-to-analog and analog-to-digital circuits.
06.35 Identify types of digital displays.
06.36 Construct digital display circuits.
06.37 Troubleshoot digital display circuits.

07.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

07.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
07.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
07.03 Read and follow written and oral instructions.
07.04 Answer and ask questions coherently and concisely.
07.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
07.06 Demonstrate appropriate telephone/communication skills.

08.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

08.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
08.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
08.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
08.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
08.05 Demonstrate an understanding of federal, state and local taxes and their computation.

09.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

09.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
09.02 Draw conclusions or make inferences from data.
09.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
09.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

10.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

10.01 Conduct a job search.
10.02 Secure information about a job.
10.03 Identify documents that may be required when applying for a job.
10.04 Complete a job application form correctly.
10.05 Demonstrate competence in job interview techniques.
10.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
10.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
10.07 Identify acceptable work habits.
10.08 Demonstrate knowledge of how to make appropriate job changes.
10.09 Demonstrate acceptable employee health habits.
10.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

11.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

11.01 Define entrepreneurship.
11.02 Describe the importance of entrepreneurship to the American economy.
11.03 List the advantages and disadvantages of business ownership.
11.04 Identify the risks involved in ownership of a business.
11.05 Identify the necessary personal characteristics of a successful entrepreneur.
11.06 Identify the business skills needed to operate a small business efficiently and effectively.

Program: 8730000 Electronics

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8730010
Course Title: Electronics 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for developing proficiency in laboratory practices and in DC circuits.

01.0 DEMONSTRATE PROFICIENCY IN LABORATORY PRACTICES--The student will be able to:

- 01.01 Apply proper Occupational Safety Health Administration (OSHA) safety standards.
- 01.02 Make electrical connections.
- 01.03 Identify and use hand tools properly.
- 01.04 Identify and use power tools properly.
- 01.05 Demonstrate acceptable soldering and desoldering techniques.

02.0 DEMONSTRATE PROFICIENCY IN DIRECT CURRENT (DC) CIRCUITS--The student will be able to:

- 02.01 Solve algebraic problems to include exponentials (prerequisite to DC).
- 02.02 Solve problems in electronic units utilizing metric prefixes.
- 02.03 Relate electricity to the nature of matter.
- 02.04 Identify sources of electricity.
- 02.05 Define voltage, current, resistance, power and energy.
- 02.06 Apply Ohm's law and Watts' law.
- 02.07 Read and interpret color codes and symbols to identify electrical components and values.
- 02.08 Measure properties of a circuit using volt-ohm meter (VOM) and digital volt-ohm meter (DVM) meters and oscilloscopes.
- 02.09 Compute and measure conductance and resistance of conductors and insulators.
- 02.10 Apply Ohm's law to series circuits.
- 02.11 Construct and verify operation of series circuits.
- 02.12 Analyze and troubleshoot series circuits.
- 02.13 Apply Ohm's law to parallel circuits.
- 02.14 Construct and verify the operation of parallel circuits.
- 02.15 Analyze and troubleshoot parallel circuits.
- 02.16 Apply Ohm's law to series-parallel and parallel-series circuits.
- 02.17 Construct and verify the operation of series-parallel and parallel series and bridge circuits.
- 02.18 Troubleshoot series-parallel and parallel-series and bridge circuits.
- 02.19 Identify and define voltage divider circuits (loaded and unloaded).

02.20 Construct and verify the operation of voltage divider circuits (loaded and unloaded).

02.21 Analyze and troubleshoot voltage divider circuits (loaded and unloaded).

02.22 Apply maximum power transfer theory.

02.23 Construct and verify the operation of DC circuits that demonstrate the maximum power transfer theory.

02.24 Describe magnetic properties of circuits and devices.

02.25 Determine the physical and electrical characteristics of capacitors and inductors.

02.26 Define reactive-capacitance (R-C) and inductive-reactance (R-L) time constants and classify the output of differentiators and integrators.

02.27 Set up and operate power supplies for DC circuits.

Program: 8730000 Electronics

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8730020
Course Title: Electronics 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for developing proficiency in AC circuits.

03.0 DEMONSTRATE PROFICIENCY IN ALTERNATING CURRENT (AC) CIRCUITS--The student will be able to:

- 03.01 Solve basic trigonometric problems as applicable to electronics (prerequisite to AC).
- 03.02 Identify properties of an AC signal.
- 03.03 Identify AC sources.
- 03.04 Analyze and measure AC signals utilizing VOM, DVM, oscilloscope, frequency counter and function generator.
- 03.05 Define the characteristics of AC capacitive circuits.
- 03.06 Construct and verify the operation of AC capacitive circuits.
- 03.07 Analyze and troubleshoot AC capacitive circuits.
- 03.08 Define the characteristics of AC inductive circuits.
- 03.09 Construct and verify the operation of AC inductive circuits.
- 03.10 Analyze and troubleshoot AC inductive circuits.
- 03.11 Define and apply the principles of transformers to AC circuits.
- 03.12 Construct and verify the operation of AC circuits utilizing transformers.
- 03.13 Analyze and troubleshoot AC circuits utilizing transformers.
- 03.14 Construct and verify the operation of differentiators and integrators to determine R-C and R-L time constraints.
- 03.15 Analyze and troubleshoot differentiator and integrator circuits.
- 03.16 Define the characteristics of resistance inductance capacitance (RLC) circuits (series, parallel and complex).
- 03.17 Construct and verify the operation of RLC circuits (series, parallel and complex).
- 03.18 Define the characteristics of series and parallel resonant circuits.
- 03.19 Construct and verify the operation of series and parallel resonant circuits.
- 03.20 Analyze and troubleshoot R-C, and R-L and RLC circuits.
- 03.21 Define the characteristics of frequency selective filter circuits.
- 03.22 Construct and verify the operation of frequency selective filter circuits.
- 03.23 Analyze and troubleshoot frequency selective filter circuits.
- 03.24 Define the characteristics of polyphase circuits.
- 03.25 Define basic motor theory and operation.
- 03.26 Define basic generator theory and operation.

03.27 Set up and operate power supplies for AC circuits.
03.28 Analyze and measure power in AC circuits.
03.29 Set up and operate capacitor and inductor analyzers for AC circuits.

Program: 8730000 Electronics

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8730030
Course Title: Electronics 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for developing proficiency in sold-state devices.

04.0 DEMONSTRATE PROFICIENCY IN SOLID-STATE DEVICES--The student will be able to:

- 04.01 Identify and define properties of semiconductor materials.
- 04.02 Identify and define operating characteristics and applications of junction diodes.
- 04.03 Identify and define operating characteristics and application of special diodes.
- 04.04 Construct diode circuits.
- 04.05 Analyze and troubleshoot diode circuits.
- 04.06 Identify and define operating characteristics and applications of bipolar transistors.
- 04.07 Identify and define operating characteristics and applications of field effect transistors.
- 04.08 Identify and define operating characteristics and applications of single-stage amplifiers.
- 04.09 Construct single-stage amplifiers.
- 04.10 Analyze and troubleshoot single-stage amplifiers.
- 04.11 Construct thyristor circuitry.
- 04.12 Analyze and troubleshoot thyristor circuitry.
- 04.13 Set up and operate a VOM for solid-state devices.
- 04.14 Set up and operate a DVM for solid-state devices.
- 04.15 Set up and operate power supplies for solid-state devices.
- 04.16 Set up and operate oscilloscopes for solid-state devices.
- 04.17 Set up and operate function generators for solid-state devices.
- 04.18 Set up and operate capacitor and inductor analyzers for solid-state devices.
- 04.19 Setup and operate curve tracers.
- 04.20 Setup and operate transistor testers.

Program: 8730000 Electronics

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8730040
Course Title: Electronics 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for developing proficiency in analog circuits.

05.0 DEMONSTRATE PROFICIENCY IN ANALOG CIRCUITS--The student will be able to:

05.01 Identify and define operational characteristics and applications of multistage amplifiers.
05.02 Construct multistage amplifiers.
05.03 Analyze and troubleshoot multistage amplifiers.
05.04 Identify and define operating characteristics and applications of linear integrated circuits.
05.05 Identify and define operating characteristics and applications of basic power supplies and filters.
05.06 Construct basic power supplies and filters.
05.07 Troubleshoot basic power supplies and filters.
05.08 Identify and define operating characteristics and applications of differential and operational amplifiers.
05.09 Construct differential and operational amplifier circuits.
05.10 Analyze and troubleshoot differential and operational amplifier circuits.
05.11 Identify and define operating characteristics of audio power amplifiers.
05.12 Construct audio power amplifiers.
05.13 Analyze and troubleshoot audio power amplifiers.
05.14 Identify and define operating characteristics and applications of power supply regulator circuits.
05.15 Construct power supply regulator circuits.
05.16 Analyze and troubleshoot power supply regulator circuits.
05.17 Identify and define operating characteristics and applications of active filters.
05.18 Construct active filter circuits.
05.19 Analyze and troubleshoot active filter circuits.
05.20 Identify and define operating characteristics and applications of sinusoidal and nonsinusoidal oscillator circuits.
05.21 Construct oscillator circuits.
05.22 Analyze and troubleshoot oscillator circuits.
05.23 Identify and define operating characteristics and applications of motor phase-shift control circuits (single-phase and multiphase).
05.24 Identify and define operating characteristics and applications of cathode ray tubes.
05.25 Identify and define operating characteristics and applications of optcelectronic devices.

05.26 Set up and operate measuring instruments for analog circuits.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8730050
Course Title: Electronics 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for developing proficiency in digital devices.

06.0 DEMONSTRATE PROFICIENCY IN DIGITAL CIRCUITS--The student will be able to:

- 06.01 Define and apply numbering systems to codes and arithmetic operations.
- 06.02 Analyze and minimize logic circuits using Boolean operations.
- 06.03 Set up and operate logic probes for digital circuits.
- 06.04 Set up and operate power supplies for digital circuits and solve power distribution and noise problems.
- 06.05 Set up and operate pulsers for digital circuits.
- 06.06 Set up and operate oscilloscopes for digital circuits.
- 06.07 Set up and operate logic analyzers for digital circuits.
- 06.08 Set up and operate pulse generators for digital circuits.
- 06.09 Identify types of logic gates and their truth tables.
- 06.10 Construct combinational logic circuits using integrated circuits.
- 06.11 Troubleshoot logic circuits.
- 06.12 Analyze types of flip-flops and their truth tables.
- 06.13 Construct flip-flops using integrated circuits.
- 06.14 Troubleshoot flip-flops.
- 06.15 Identify, define and measure characteristics of integrated circuits (IC) logic families.
- 06.16 Identify types of registers and counters.
- 06.17 Construct registers and counters using flip-flops and logic gates.
- 06.18 Troubleshoot registers and counters.
- 06.19 Analyze clock and timing circuits.
- 06.20 Construct clock and timing circuits.
- 06.21 Troubleshoot clock and timing circuits.
- 06.22 Identify types of arithmetic-logic circuits.
- 06.23 Construct arithmetic-logic circuits.
- 06.24 Troubleshoot arithmetic-logic circuits.
- 06.25 Identify types of encoding and decoding devices.
- 06.26 Construct encoders and decoders.
- 06.27 Troubleshoot encoders and decoders.
- 06.28 Identify types of multiplexer and demultiplexer circuits.
- 06.29 Construct multiplexer and demultiplexer circuits using integrated circuits.
- 06.30 Troubleshoot multiplexer and demultiplexer circuits.
- 06.31 Identify types of memory circuits.

06.32 Relate the uses of digital-to-analog and analog-to-digital conversions.
06.33 Construct digital-to-analog and analog-to-digital circuits.
06.34 Troubleshoot digital-to-analog and analog-to-digital circuits.
06.35 Identify types of digital displays.
06.36 Construct digital display circuits.
06.37 Troubleshoot digital display circuits.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8730060
Course Title: Electronics 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in developing technical recording and reporting skills and in demonstrating employability skills.

07.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 07.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 07.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 07.03 Read and follow written and oral instructions.
- 07.04 Answer and ask questions coherently and concisely.
- 07.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 07.06 Demonstrate appropriate telephone/communication skills.

08.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 08.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 08.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 08.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 08.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 08.05 Demonstrate an understanding of federal, state and local taxes and their computation.

09.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 09.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 09.02 Draw conclusions or make inferences from data.
- 09.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 09.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

10.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

10.01 Conduct a job search.
10.02 Secure information about a job.
10.03 Identify documents that may be required when applying for a job.
10.04 Complete a job application form correctly.
10.05 Demonstrate competence in job interview techniques.
10.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
10.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
10.07 Identify acceptable work habits.
10.08 Demonstrate knowledge of how to make appropriate job changes.
10.09 Demonstrate acceptable employee health habits.
10.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

11.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

11.01 Define entrepreneurship.
11.02 Describe the importance of entrepreneurship to the American economy.
11.03 List the advantages and disadvantages of business ownership.
11.04 Identify the risks involved in ownership of a business.
11.05 Identify the necessary personal characteristics of a successful entrepreneur.
11.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Electronics Engineering Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.030301
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT**: The program is designed to prepare individuals for employment as electrical and electronics technicians (22505231), electronic engineering technicians or in related occupations in electronics, or to provide supplemental training for persons previously or currently employed in these occupations. This program includes the Florida core electronics competencies as identified by the electronics industry, which is prerequisite for all specialized programs. This program prepares individuals to assemble, install, operate, maintain, troubleshoot and repair electronic equipment used in industry.

Graduates of this program will be prepared to enter advanced training and education in specialized electronics related fields. They may also be employed as trainees in various electronics related positions in certain industries.

The content includes, but is not limited to, DC circuits, AC circuits, solid-state devices, analog circuits, digital circuits and microprocessor systems. Integrated into this content will be communications skills, leadership skills, human relations skills, employability skills, safe and efficient work practices, use of circuit diagrams and schematics, soldering, laboratory practices and technical recording and reporting.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Electronics Engineering industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Electronic laboratory activities are an integral part of this program. The tools, test equipment, materials, processes and safety practices used in this laboratory are similar to those used in industry. Students should be able to use the various types of precision test equipment found in general use throughout the electronics industry for the purpose of analyzing, troubleshooting and repairing electronic circuitry.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational

Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

As part of an Associate in Science Degree, there is a major component of general education requirements which allows the student to more easily relate the technical knowledge gained to a theoretical level and to allows for a greater knowledge expansion and transference in the future.

This program requires a minimum of 15 semester hours of general education. At least two components of this core must be courses designed to develop skills in oral and written communication and in computational skills. The computational skills shall include algebra and trigonometry.

Algebra is recommended as a prerequisite for entry into this program.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences and a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

When content from the Florida common core electronics program (Electronics Technology) is included, the typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in laboratory practices.
02.0 Demonstrate proficiency in direct current (DC) circuits.
03.0 Demonstrate proficiency in alternating current (AC) circuits.
04.0 Demonstrate proficiency in solid-state devices.
05.0 Demonstrate proficiency in analog circuits.
06.0 Demonstrate proficiency in digital circuits.
07.0 Demonstrate proficiency in microprocessor systems.
08.0 Demonstrate proficiency in technical recording and reporting.
09.0 Demonstrate proficiency in direct current (DC) network analysis.
10.0 Demonstrate proficiency in alternating current (AC) network and coupled circuit analysis.
11.0 Demonstrate proficiency in design and analysis of discrete solid-state circuits.
12.0 Demonstrate proficiency in design and analysis of systems using linear integrated circuits.
13.0 Demonstrate proficiency in programming, design and analysis of microprocessor based systems.
14.0 Demonstrate employability skills.
15.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Electronics Engineering Technology
Secondary Number:
Postsecondary Number: 0615.030301

01.0 DEMONSTRATE PROFICIENCY IN LABORATORY PRACTICES--The student will be able to:

- 01.01 Apply proper Occupational Safety Health Administration (OSHA) safety standards.
- 01.02 Make electrical connections.
- 01.03 Identify and use hand tools properly.
- 01.04 Identify and use power tools properly.
- 01.05 Demonstrate acceptable soldering techniques.
- 01.06 Demonstrate acceptable desoldering techniques.
- 01.07 Demonstrate electro static discharge (ESD) safety procedures.
- 01.08 Describe the construction of printed circuit boards (PCB's).
- 01.09 Explain the theoretical concepts of soldering.
- 01.10 Demonstrate reqork and repair techniques.
- 01.11 Demonstrate the use of a micro-computer operating system.
- 01.12 Demonstrate the use of a high level computer language.
- 01.13 Demonstrate the use of micro-computer application programs (i.e., word processing, data base, spreadsheet).

02.0 DEMONSTRATE PROFICIENCY IN DIRECT CURRENT (DC) CIRCUITS--The student will be able to:

- 02.01 Solve algebraic problems to include exponential (prerequisite to DC).
- 02.02 Solve problems in electronic units utilizing metric prefixes.
- 02.03 Relate electricity to the nature of matter.
- 02.04 Identify sources of electricity.
- 02.05 Define voltage, current, resistance, power and energy.
- 02.06 Apply Ohm's law and power formulas.
- 02.07 Read and interpret color codes and symbols to identify electrical components and values.
- 02.08 Measure properties of a circuit using volt-ohm meter (VOM) and digital volt-ohm meter (DVM) meters and oscilloscopes.
- 02.09 Compute conductance and compute and measure resistance of conductors and insulators.
- 02.10 Apply Ohm's law to series circuits.
- 02.11 Construct and verify operation of series circuits.
- 02.12 Analyze and troubleshoot series circuits.
- 02.13 Apply Ohm's law to parallel circuits.
- 02.14 Construct and verify the operation of parallel circuits.
- 02.15 Analyze and troubleshoot parallel circuits.
- 02.16 Apply Ohm's law to series-parallel and parallel-series circuits.
- 02.17 Construct and verify the operation of series-parallel and parallel-series and bridge circuits.
- 02.18 Troubleshoot series-parallel and parallel-series and bridge circuits.
- 02.19 Identify and define voltage divider circuits (loaded and unloaded).
- 02.20 Construct and verify the operation of voltage divider circuits (loaded and unloaded).

02.21 Analyze and troubleshoot voltage divider circuits (loaded and unloaded).
02.22 Apply maximum power transfer theory.
02.23 Construct and verify the operation of DC circuits that demonstrate the maximum power transfer theory.
02.24 Describe magnetic properties of circuits and devices.
02.25 Determine the physical and electrical characteristics of capacitors and inductors.
02.26 Define resistor-capacitor (R-C) and resistor inductor (R-L) time constants and classify the output of differentiators and integrators.
02.27 Set up and operate power supplies for DC circuits.

03.0 DEMONSTRATE PROFICIENCY IN ALTERNATING CURRENT (AC) CIRCUITS--The student will be able to:

03.01 Solve basic trigonometric problems as applicable to electronics (prerequisite to AC).
03.02 Identify properties of an AC signal.
03.03 Identify AC sources.
03.04 Analyze and measure AC signals utilizing VOM, DVM, oscilloscope, frequency counter and function generator.
03.05 Define the characteristics of AC capacitive circuits.
03.06 Construct and verify the operation of AC capacitive circuits.
03.07 Analyze and troubleshoot AC capacitive circuits.
03.08 Define the characteristics of AC inductive circuits.
03.09 Construct and verify the operation of AC inductive circuits.
03.10 Analyze and troubleshoot AC inductive circuits.
03.11 Define and apply the principles of transformers to AC circuits.
03.12 Construct and verify the operation of AC circuits utilizing transformers.
03.13 Analyze and troubleshoot AC circuits utilizing transformers.
03.14 Construct and verify the operation of differentiators and integrators to determine R-C and R-L time constraints.
03.15 Analyze and troubleshoot differentiator and integrator circuits.
03.16 Define the characteristics of resistance inductance capacitance (RLC) circuits (series, parallel and complex).
03.17 Construct and verify the operation of RLC circuits (series, parallel and complex).
03.18 Define the characteristics of series and parallel resonant circuits.
03.19 Construct and verify the operation of series and parallel resonant circuits.
03.20 Analyze and troubleshoot R-C, R-L and RLC circuits.
03.21 Define the characteristics of frequency selective filter circuits.
03.22 Construct and verify the operation of frequency selective filter circuits.
03.23 Analyze and troubleshoot frequency selective filter circuits.
03.24 Define the characteristics of polyphase circuits.
03.25 Define basic motor theory and operation.
03.26 Define basic generator theory and operation.
03.27 Set up and operate power supplies for AC circuits.
03.28 Analyze and measure power in AC circuits.
03.29 Set up and operate capacitor and inductor analyzers for AC circuits.

04.0 DEMONSTRATE PROFICIENCY IN SOLID-STATE DEVICES--The student will be able to:

04.01 Identify and define properties of semiconductor materials.
04.02 Identify and define operating characteristics and applications of junction diodes.
04.03 Identify and define operating characteristics and applications of special diodes.
04.04 Construct diode circuits.
04.05 Analyze and troubleshoot diode circuits.
04.06 Identify and define operating characteristics and applications of bipolar transistors.
04.07 Identify and define operating characteristics and applications of field effect transistors.
04.08 Identify and define operating characteristics and applications of single-stage amplifiers.
04.09 Construct single-stage amplifiers.
04.10 Analyze and troubleshoot single-stage amplifiers.
04.11 Construct thyristor circuitry.
04.12 Analyze and troubleshoot thyristor circuitry.
04.13 Set up and operate a VOM for solid-state devices.
04.14 Set up and operate a DVM for solid-state devices.
04.15 Set up and operate power supplies for solid-state devices.
04.16 Set up and operate oscilloscopes for solid-state devices.
04.17 Set up and operate function generators for solid-state devices.
04.18 Set up and operate capacitor and inductor analyzers for solid-state devices.
04.19 Set up and operate curve tracers.
04.20 Set up and operate transistor testers.

05.0 DEMONSTRATE PROFICIENCY IN ANALOG CIRCUITS--The student will be able to:

05.01 Identify and define operational characteristics and applications of multistage amplifiers.
05.02 Construct multistage amplifiers.
05.03 Analyze and troubleshoot multistage amplifiers.
05.04 Identify and define operating characteristics and applications of linear integrated circuits.
05.05 Identify and define operating characteristics and applications of basic power supplies and filters.
05.06 Construct basic power supplies and filters.
05.07 Troubleshoot basic power supplies and filters.
05.08 Identify and define operating characteristics and applications of differential and operational amplifiers.
05.09 Construct differential and operational amplifier circuits.
05.10 Analyze and troubleshoot differential and operational amplifier circuits.
05.11 Identify and define operating characteristics of audio power amplifiers.
05.12 Construct audio power amplifiers.
05.13 Analyze and troubleshoot audio power amplifiers.
05.14 Identify and define operating characteristics and applications of power supply regulator circuits.
05.15 Construct power supply regulator circuits.
05.16 Analyze and troubleshoot power supply regulator circuits.
05.17 Identify and define operating characteristics and applications of active filters.
05.18 Construct active filter circuits.
05.19 Analyze and troubleshoot active filter circuits.
05.20 Identify and define operating characteristics and applications of sinusoidal and nonsinusoidal oscillator circuits.
05.21 Construct oscillator circuits.

05.22 Analyze and troubleshoot oscillator circuits.
05.23 Identify and define operating characteristics and applications of cathode ray tubes.
05.24 Identify and define operating characteristics and applications of optoelectronic devices.
05.25 Set up and operate measuring instruments for analog circuits.

06.0 DEMONSTRATE PROFICIENCY IN DIGITAL CIRCUITS--The student will be able to:

06.01 Define and apply numbering systems to codes and arithmetic operations.
06.02 Analyze and minimize logic circuits using Boolean operations.
06.03 Set up and operate logic probes for digital circuits.
06.04 Set up and operate power supplies for digital circuits and solve power distribution and noise problems.
06.05 Set up and operate pulsers for digital circuits.
06.06 Set up and operate oscilloscopes for digital circuits.
06.07 Set up and operate logic analyzers for digital circuits.
06.08 Set up and operate pulse generators for digital circuits.
06.09 Identify types of logic gates and their truth tables.
06.10 Construct combinational logic circuits using integrated circuits.
06.11 Troubleshoot logic circuits.
06.12 Analyze types of flip-flops and their truth tables.
06.13 Construct flip-flops using integrated circuits.
06.14 Troubleshoot flip-flops.
06.15 Identify, define and measure characteristics of integrated circuit (IC) logic families.
06.16 Identify types of registers and counters.
06.17 Construct registers and counters using flip-flops and logic gates.
06.18 Troubleshoot registers and counters.
06.19 Analyze clock and timing circuits.
06.20 Construct clock and timing circuits.
06.21 Troubleshoot clock and timing circuits.
06.22 Identify types of arithmetic-logic circuits.
06.23 Construct arithmetic-logic circuits.
06.24 Troubleshoot arithmetic-logic circuits.
06.25 Identify types of encoding and decoding devices.
06.26 Construct encoders and decoders.
06.27 Troubleshoot encoders and decoders.
06.28 Identify types of multiplexer and demultiplexer circuits.
06.29 Construct multiplexer and demultiplexer circuits using integrated circuits.
06.30 Troubleshoot multiplexer and demultiplexer circuits.
06.31 Identify types of memory circuits.
06.32 Relate the uses of digital-to-analog and analog-to-digital conversions.
06.33 Construct digital-to-analog and analog-to-digital circuits.
06.34 Troubleshoot digital-to-analog and analog-to-digital circuits.
06.35 Identify types of digital displays.
06.36 Construct digital display circuits.
06.37 Troubleshoot digital display circuits.

07.0 DEMONSTRATE PROFICIENCY IN MICROPROCESSOR SYSTEMS--The student will be able to:

07.01 Identify central processing unit (CPU) building blocks and their uses (architecture).

07.02 Analyze BUS concepts.
07.03 Analyze various memory schemes.
07.04 Use memory devices in circuits.
07.05 Troubleshoot memory device circuits.
07.06 Set up and operate oscilloscopes for microprocessor systems.
07.07 Set up and operate logic-data analyzers to troubleshoot microprocessor systems.
07.08 Identify types of input and output devices and peripherals.
07.09 Interface input and output ports to peripherals.
07.10 Analyze and troubleshoot input and output ports.
07.11 Execute computer instruction sets.

08.0 DEMONSTRATE PROFICIENCY IN TECHNICAL RECORDING AND REPORTING--The student will be able to:

08.01 Draw and interpret electronic schematics.
08.02 Record data and design curves and graphs.
08.03 Write reports and make oral presentations.
08.04 Maintain test logs.
08.05 Make equipment failure reports.
08.06 Specify and requisition simple electronic components.
08.07 Compose technical letters and memoranda.
08.08 Write formal reports of laboratory experiences.
08.09 Draft preventive maintenance and calibration procedures.

09.0 DEMONSTRATE PROFICIENCY IN DIRECT CURRENT (DC) NETWORK ANALYSIS--The student will be able to:

09.01 Analyze multisource circuits using Millman's theorem.
09.02 Analyze multisource circuits using superposition theorem.
09.03 Analyze multisource circuits using mesh currents.
09.04 Analyze multisource circuits using branch currents.
09.05 Analyze multisource circuits using nodal analysis.
09.06 Analyze multisource circuits using Thevenin's theorem.
09.07 Analyze multisource circuits using Norton's theorem.
09.08 Analyze DC circuits using computer programs.

10.0 DEMONSTRATE PROFICIENCY IN ALTERNATING CURRENT (AC) NETWORK AND COUPLED CIRCUIT ANALYSIS--The student will be able to:

10.01 Design and analyze magnetic circuits.
10.02 Apply Faraday's law of induced voltages.
10.03 Solve for mutual inductance in a coupled circuit.
10.04 Analyze AC circuits using network theorems.
10.05 Solve problems in transient analysis in RC and RL circuits.
10.06 Demonstrate and analyze the effects of loading on transformers.
10.07 Analyze RLC circuits using complex numbers.
10.08 Design, construct and analyze RC filters.
10.09 Analyze AC circuits using computer programs.

11.0 DEMONSTRATE PROFICIENCY IN DESIGN AND ANALYSIS OF DISCRETE SOLID-STATE CIRCUITS--The student will be able to:

11.01 Design, construct and analyze full-wave rectifier power supplies with capacitor input filters.
11.02 Design, construct and analyze zener diode regulator circuits for given load currents.
11.03 Design, construct and analyze switching power supply circuits.
11.04 Design, construct and analyze bipolar transistor amplifier Q point stability using several methods of bias.

11.05 Analyze bipolar junction transistor amplifiers using the small signal equivalent circuit.
11.06 Design and analyze bipolar junction transistor amplifiers using hybrid parameters.
11.07 Design, construct and analyze junction field.
11.08 Design, construct and analyze multistage loaded amplifiers using RC, direct and transformer coupling.
11.09 Design, construct and analyze power amplifiers using single-ended, push-pull and complementary symmetry methods.
11.10 Design, construct and analyze photoisolator, coupling and switching circuits.
11.11 Analyze discrete solid-state circuits using computer programs.

12.0 DEMONSTRATE PROFICIENCY IN DESIGN AND ANALYSIS OF SYSTEMS USING LINEAR INTEGRATED CIRCUITS--The student will be able to:

12.01 Design, construct and analyze an integrated circuit power amplifier.
12.02 Solve problems in heat sinking and power limitations for AF power amplifiers.
12.03 Select the IC's appropriate to the defined parameters of a circuit.
12.04 Measure and analyze common mode rejection ratio and DC offset for operational amplifiers.
12.05 Design and test a lag network to increase the stability of an operational amplifier.
12.06 Construct and analyze operational amplifier circuits used in limiters, zero crossing detector, comparator and sample and hold circuits.
12.07 Construct and analyze operational amplifier summing, multivibrator and active filter circuits.

13.0 DEMONSTRATE PROFICIENCY IN PROGRAMMING, DESIGN AND ANALYSIS OF MICROPROCESSOR BASED SYSTEMS--The student will be able to:

13.01 Analyze the connections and programming for interrupt driven I/Q.
13.02 Write a machine-level program and verify correct operation of switches and led's in a microprocessor system.
13.03 Design and implement the addition of RAM in a microprocessor system.
13.04 Erase and program an eprom.
13.05 Write a machine-level program to initialize a peripheral interface adaptor.
13.06 Analyze and draw a timing diagram showing all pertinent bus signals in a microprocessor system.
13.07 Analyze and decode a machine-language program using a timing diagram.
13.08 Program and interface input devices.
13.09 Program and interface output devices.
13.10 Program and interface a serial data link using a microprocessor system.
13.11 Write programs using data movement, logical and shifting.
13.12 Write programs using control loops and integer arithmetic operations on arrays of numbers.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

14.01 Conduct a job search.
14.02 Secure information about a job.

14.03 Identify documents that may be required when applying for a job.
14.04 Complete a job application form correctly.
14.05 Demonstrate competence in job interview techniques.
14.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
14.07 Identify acceptable work habits.
14.08 Demonstrate knowledge of how to make appropriate job changes.
14.09 Demonstrate acceptable employee health habits.
14.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

15.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

15.01 Define entrepreneurship.
15.02 Describe the importance of entrepreneurship to the American economy.
15.03 List the advantages and disadvantages of business ownership.
15.04 Identify the risks involved in ownership of a business.
15.05 Identify the necessary personal characteristics of a successful entrepreneur.
15.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Engineering Assisting
Occupational Area:	Industrial Education
	Secondary
Program Numbers	**8743000**
CIP Number	0647.030301
Grade Level	9-12, 30, 31
Length	6 credits
Certification	TEC CONSTR ¶7 ¶G
	BLDG CONST ¶7 ¶G
	MILLWRIGHT @7 G
	IND ENGR @7 G
	TEC EN AID ¶7 ¶G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as machinery maintenance workers (85128630), Engineer Assistant, or general maintenance mechanics. This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content will include the following: safety and the proper use of tools and equipment, customer service, mathematics, blueprint reading, layout and metal fabrication, welding, electricity, two-stroke, four-stroke, and diesel engine repair, drive components, lubricants, employability skills, and entrepreneurship.

Listed below are the courses that comprise this program when offered at the secondary level:

8743010 - Engineering Assisting 1
8743020 - Engineering Assisting 2
8743030 - Engineering Assisting 3
8743040 - Engineering Assisting 4
8743050 - Engineering Assisting 5
8743060 - Engineering Assisting 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Engineering industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program and provide instruction in the use of tools, equipment, materials and processes found in the industry. The laboratory activities provide the student opportunities to apply the skills learned in each of the outcome areas contained in this program.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the

vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Apply safety rules and procedures.
02.0 Use tools and equipment.
03.0 Demonstrate proficiency in applying customer service skills.
04.0 Perform mathematical calculations.
05.0 Demonstrate ability to read plans and drawings.
06.0 Perform measuring and layout operations.
07.0 Describe metals and their properties.
08.0 Operate metalworking machines.
09.0 Perform metal fabrication operations.
10.0 Perform gas welding and cutting operations.
11.0 Perform electric metal-bonding operations.
12.0 Perform bench work skills.
13.0 Demonstrate knowledge of basic electricity and electronics.
14.0 Demonstrate proficiency in repairing and maintaining basic two-stroke cycle engines.
15.0 Demonstrate proficiency in repairing and maintaining basic four-stroke cycle engines.
16.0 Demonstrate proficiency in maintaining and repairing diesel engines.
17.0 Maintain drive components.
18.0 Maintain piping and tubing.
19.0 Troubleshoot hydraulic and pneumatic systems.
20.0 Handle and apply lubricants.
21.0 Demonstrate appropriate communication skills.
22.0 Demonstrate appropriate understanding of basic science.
23.0 Demonstrate employability skills.
24.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Engineering Assisting
Secondary Number: 8743000
Postsecondary Number:

01.0 APPLY SAFETY RULES AND PROCEDURES--The student will be able to:

- 01.01 Practice shop safety rules and procedures.
- 01.02 Practice personal safety rules and procedures.
- 01.03 Practice fire safety rules and procedures.
- 01.04 Practice electrical safety rules and procedures.
- 01.05 Practice tool safety rules and procedures.
- 01.06 Maintain a clean work and shop area.

02.0 USE TOOLS AND EQUIPMENT--The student will be able to:

- 02.01 Use general hand tools.
- 02.02 Use special hand tools.
- 02.03 Use precision measuring tools.
- 02.04 Use power tools.
- 02.05 Use fasteners.
- 02.06 Use gaskets and choose sealants.

03.0 DEMONSTRATE PROFICIENCY IN APPLYING CUSTOMER SERVICE SKILLS--The student will be able to:

- 03.01 Prepare service orders properly.
- 03.02 Communicate solutions to customers.
- 03.03 Follow manufacturers' service manuals.
- 03.04 Locate parts in a parts catalog or on microfiche.

04.0 PERFORM MATHEMATICAL CALCULATIONS--The student will be able to:

- 04.01 Make job-related decimal and fraction calculations.
- 04.02 Solve job-related problems by adding, subtracting, multiplying and dividing numbers.
- 04.03 Solve job-related problems using a hand-held calculator.
- 04.04 Solve job-related problems using basic formulas.
- 04.05 Solve job-related problems using basic geometry.
- 04.06 Measure a workpiece and compare measurements with blueprint specifications.
- 04.07 Solve job-related problems using mathematical handbooks, charts, and tables.
- 04.08 Convert measurements from English to metric and from metric to English units.

05.0 DEMONSTRATE ABILITY TO READ PLANS AND DRAWINGS--The student will be able to:

- 05.01 Identify dimensions.
- 05.02 Identify lists of materials and specifications.
- 05.03 Identify section views detail views.
- 05.04 Sketch and dimension a part.
- 05.05 Disassemble and assemble parts using an exploded view drawing.
- 05.06 Interpret blueprint abbreviations.

05.07 Identify dimensioning of radii, round holes, fillets, and chamfers.
05.08 Identify screw threads and bolt types.
05.09 Apply dimensional tolerances.
05.10 Identify metal fabrication symbols used in blueprints.

06.0 PERFORM MEASURING AND LAYOUT OPERATIONS--The student will be able to:

06.01 Perform basic geometric construction.
06.02 Use marking gages, center punches, scribes, surface gages, squares, dividers, dial indicators, protractors, surfaceplates, depth gages, and circumference rules.
06.03 Develop patterns using parallel line, radial lines, and triangulation.
06.04 Make metal fabrication sketches.
06.05 Read and measure with steel rules.
06.06 Read and measure with micrometers.
06.07 Read and measure with vernier tools.
06.08 Read and measure with dial calipers.
06.09 Read and measure with dial indicators.

07.0 DESCRIBE METALS AND THEIR PROPERTIES--The student will be able to:

07.01 Describe the steelmaking process.
07.02 Describe the differences between ferrous and nonferrous metals.
07.03 Describe casting, alloys, and forging.
07.04 Identify metals such as galvanized iron and steel, aluminum, stainless steel, sheet metal, copper, and brass.
07.05 Identify properties of the most common metals.
07.06 Identify and describe common gages, shapes, and dimensions of purchased materials.

08.0 OPERATE METALWORKING MACHINES--The student will be able to:

08.01 Identify the purpose of various types of machine shop equipment.
08.02 Operate a drill press utilizing the correct drilling speed.
08.03 Operate a band saw utilizing the correct cutting speed.
08.04 Demonstrate clamping devices for securing stock for drilling.
08.05 Identify types and sizes of drill bits.
08.06 Use portable power saw equipment.
08.07 Use a cutoff or power hacksaw.
08.08 Use electric and air utility grinders.
08.09 Sharpen drill bits.
08.10 Select proper type of abrasive wheels for grinding machines.

09.0 PERFORM METAL FABRICATION OPERATIONS--The student will be able to:

09.01 Fabricate metal, edges, and seams.
09.02 Use hand tools to cut, punch, and shear metal.
09.03 Form sheet metal using a brake, a folder, rolls, and a shear.
09.04 Join metals using solder, rivets, and mechanical fasteners.

10.0 PERFORM GAS WELDING AND CUTTING OPERATIONS--The student will be able to:

10.01 Identify welding cylinders, regulators, hoses, pressure gages, and torches.
10.02 Describe welding equipment safety procedures.
10.03 Demonstrate proper flame settings.
10.04 Demonstrate basic gas welding skills.

10.05 Demonstrate procedures for adjusting and operating the oxyacetylene cutting torch.
10.06 Demonstrate freehand and guide cutting of various metal thickness.

11.0 PERFORM ELECTRIC METAL-BONDING OPERATIONS--The student will be able to:

11.01 Describe and demonstrate the spot and arc welding process.
11.02 Demonstrate basic procedures for safely adjusting and operating an arc welder, selecting a rod, striking and maintaining an arc, welding in various positions, and clamping.
11.03 Set up and operate a spot welder.
11.04 Explain and demonstrate the MIG welding process.
11.05 Apply basic procedures for safely adjusting, operating, cleaning, and maintaining MIG welding equipment.
11.06 Apply basic procedures for safely adjusting and operating a TIG welder, welding in various positions, selecting proper tips, and choosing filler metal.

12.0 PERFORM BENCH WORK SKILLS--The student will be able to:

12.01 Cut materials by using hand hacksaws.
12.02 Cut threads by using hand taps.
12.03 Cut threads by using dies.
12.04 Repair threads by chasing and thread inserts.
12.05 Ream holes by using hand reamers.
12.06 Hand-sharpen cutting tools by using abrasive stones.
12.07 Hone and lap surfaces.
12.08 Remove damaged screws and other hardware.
12.09 Deburr workpieces.

13.0 DEMONSTRATE KNOWLEDGE OF BASIC ELECTRICITY AND ELECTRONICS--The student will be able to:

13.01 Define electrical/electronic terms.
13.02 Explain the theory and application of magnetism.
13.03 Explain Ohm's Law.
13.04 Describe DC and AC circuits.
13.05 Demonstrate an entry-level understanding of electrical control equipment.

14.0 DEMONSTRATE PROFICIENCY IN REPAIRING AND MAINTAINING BASIC TWO-STROKE CYCLE ENGINES--The student will be able to:

14.01 Explain the basic principles of the operation of the two-stroke cycle internal combustion engine.
14.02 Identify types of engines.
14.03 Locate engine serial and model numbers.
14.04 Identify engine assemblies and systems.
14.05 Disassemble engines.
14.06 Remove, clean, and inspect the head for cracks, warpage, and damaged spark plug threads.
14.07 Remove, clean, and inspect piston rods and assemblies.
14.08 Measure out-of-round and cylinder taper.
14.09 Check the total bearing surface of connecting rod bearings.
14.10 Measure piston skirts and ring grooves.
14.11 Measure the piston ring gap in the cylinder bore.
14.12 Accurately fit piston to cylinder.
14.13 Install piston pins according to manufacturer's specification.
14.14 Check rod and piston assembly alignment.

14.15 Install rings on pistons.
14.16 Install piston rod assemblies.
14.17 Check needle bearings.
14.18 Inspect crankshafts and install seals.
14.19 Inspect, clean, and/or replace reed valves.
14.20 Reassemble engines.

15.0 DEMONSTRATE PROFICIENCY IN REPAIRING AND MAINTAINING BASIC FOUR-STROKE CYCLE ENGINES--The student will be able to:

15.01 Explain the basic principles of the operation of the four-stroke cycle internal combustion engine.
15.02 Identify types of four-stroke cycle engines.
15.03 Locate engine serial and model numbers.
15.04 Identify engine assemblies and systems.
15.05 Disassemble engines.
15.06 Clean and inspect heads for cracks, warpage, and damaged spark plug threads.
15.07 Inspect valves for warpage, burns, cracks, stem wear, tip wear, and margin.
15.08 Grind valve seats and reface valves.
15.09 Check and inspect springs for free height, distortion, and installed height.
15.10 Adjust valve lash.
15.11 Remove and inspect camshafts and lifters.
15.12 Measure camshafts.
15.13 Service camshaft bearings.
15.14 Clear and inspect lifters for wear.
15.15 Time valve drive assemblies.
15.16 Remove piston from rods assemblies.
15.17 Measure out-of-round and cylinder taper with a dial bore gage or micrometer.
15.18 Check piston pins and bosses for wear.
15.19 Measure piston ring lands width, out-of-round, and taper.
15.20 Measure the piston ring gap in the cylinder bore.
15.21 Install and fit piston pins.
15.22 Check rod and piston assembly alignment.
15.23 Remove and replace rod bearings.
15.24 Hone and clean cylinders.
15.25 Install rings on pistons.
15.26 Measure and check crankshafts with a micrometer.
15.27 Check for end play.
15.28 Check the bearing bore with a telescoping gage using special tools provided by the engine manufacturer.
15.29 Reassemble engines.
15.30 Install oil seals.

16.0 DEMONSTRATE PROFICIENCY IN MAINTAINING AND REPAIRING DIESEL ENGINES--The student will be able to:

16.01 Identify diesel engine operating principles (two- and four-stroke cycle engines).
16.02 Identify components of two- and four-stroke cycle engines.
16.03 Troubleshoot and repair cooling systems.
16.04 Troubleshoot and repair lubrication systems.
16.05 Troubleshoot and repair induction and exhaust systems.

17.0 MAINTAIN DRIVE COMPONENTS--The student will be able to:

17.01 Demonstrate safety procedures for maintaining drive components.

17.02 Identify types of bearings.
17.03 Remove, inspect, and/or replace bearings.
17.04 Remove and replace seals.
17.05 Perform shaft alignment.
17.06 Identify types of belts.
17.07 Identify types of chains.
17.08 Perform tension adjustments on belt and chain drives.
17.09 Troubleshoot belts and chain drives.

18.0 MAINTAIN PIPING AND TUBING--The student will be able to:

18.01 Identify components of a piping system.
18.02 Explain maintenance considerations of metallic and non-metallic piping system.
18.03 Join copper tubing.
18.04 Join common fittings.
18.05 Join metallic pipe.
18.06 Join plastic pipe.
18.07 Explain valve operation and maintenance.

19.0 TROUBLESHOOT HYDRAULIC AND PNEUMATIC SYSTEMS--The student will be able to:

19.01 Explain safety procedures for troubleshooting hydraulic and pneumatic systems.
19.02 Read hydraulic and pneumatic schematics.
19.03 Explain hydraulic and pneumatic troubleshooting techniques.
19.04 Install hydraulic and pneumatic system components.
19.05 Troubleshoot, repair, and install valves.
19.06 Troubleshoot air compressors and hydraulic pumps.

20.0 HANDLE AND APPLY LUBRICANTS--The student will be able to:

20.01 Explain the functions of lubrication.
20.02 Explain the properties of oil lubricants and factors determining the selection of lubricants.
20.03 Identify the types, advantage, and functions of lubricant additives.
20.04 Identify grease application.
20.05 Identify lubricating systems and methods.
20.06 Explain lubricant storage and handling methods.
20.07 Lubricate a piece of industrial equipment.

21.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

21.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
21.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
21.03 Read and follow written and oral instructions.
21.04 Answer and ask questions coherently and concisely.
21.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
21.06 Demonstrate appropriate telephone/communication skills.

22.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

22.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
22.02 Draw conclusions or make inferences from data.
22.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
22.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

23.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

23.01 Conduct a job search.
23.02 Secure information about a job.
23.03 Identify documents which may be required when applying for a job interview.
23.04 Complete a job application form correctly.
23.05 Demonstrate competence in job interview techniques.
23.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, and other employees.
23.07 Identify acceptable work habits.
23.08 Demonstrate knowledge of how to make appropriate job changes.
23.09 Demonstrate acceptable employee health habits.
23.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

24.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

24.01 Define entrepreneurship.
24.02 Describe the importance of entrepreneurship to the American economy.
24.03 List the advantages and disadvantages of business ownership.
24.04 Identify the risks involved in ownership of a business.
24.05 Identify the necessary personal characteristics of a successful entrepreneur.
24.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743010
Course Title: Engineering Assisting 1
Course Credit: 1

COURSE DESCRIPTION:

01.0 APPLY SAFETY RULES AND PROCEDURES--The student will be able to:

- 01.01 Practice shop safety rules and procedures.
- 01.02 Practice personal safety rules and procedures.
- 01.03 Practice fire safety rules and procedures.
- 01.04 Practice electrical safety rules and procedures.
- 01.05 Practice tool safety rules and procedures.
- 01.06 Maintain a clean work and shop area.

02.0 USE TOOLS AND EQUIPMENT--The student will be able to:

- 02.01 Use general hand tools.
- 02.02 Use special hand tools.
- 02.03 Use precision measuring tools.
- 02.04 Use power tools.
- 02.05 Use fasteners.
- 02.06 Use gaskets and choose sealants.

03.0 DEMONSTRATE PROFICIENCY IN APPLYING CUSTOMER SERVICE SKILLS--The student will be able to:

- 03.01 Prepare service orders properly.
- 03.02 Communicate solutions to customers.
- 03.03 Follow manufacturers' service manuals.
- 03.04 Locate parts in a parts catalog or on microfiche.

04.0 PERFORM MATHEMATICAL CALCULATIONS--The student will be able to:

- 04.01 Make job-related decimal and fraction calculations.
- 04.02 Solve job-related problems by adding, subtracting, multiplying and dividing numbers.
- 04.03 Solve job-related problems using a hand-held calculator.
- 04.04 Solve job-related problems using basic formulas.
- 04.05 Solve job-related problems using basic geometry.
- 04.06 Measure a workpiece and compare measurements with blueprint specifications.
- 04.07 Solve job-related problems using mathematical handbooks, charts, and tables.
- 04.08 Convert measurements from English to metric and from metric to English units.

05.0 DEMONSTRATE ABILITY TO READ PLANS AND DRAWINGS--The student will be able to:

- 05.01 Identify dimensions.
- 05.02 Identify lists of materials and specifications.
- 05.03 Identify section views/detail views.
- 05.04 Sketch and dimension a part.

05.05 Disassemble and assemble parts using an exploded view drawing.
05.06 Interpret blueprint abbreviations.
05.07 Identify dimensioning of radii, round holes, fillets, and chamfers.
05.08 Identify screw threads and bolt types.
05.09 Apply dimensional tolerances.
05.10 Identify metal fabrication symbols used in blueprints.

06.0 PERFORM MEASURING AND LAYOUT OPERATIONS--The student will be able to:

06.01 Perform basic geometric construction.
06.02 Use marking gages, center punches, scribes, surface gages, squares, dividers, dial indicators, protractors, surfaceplates, depth gages, and circumference rules.
06.03 Develop patterns using parallel line, radial lines, and triangulation.
06.04 Make metal fabrication sketches.
06.05 Read and measure with steel rules.
06.06 Read and measure with micrometers.
06.07 Read and measure with vernier tools.
06.08 Read and measure with dial calipers.
06.09 Read and measure with dial indicators.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743020
Course Title: Engineering Assisting 2
Course Credit: 1

COURSE DESCRIPTION:

07.0 DESCRIBE METALS AND THEIR PROPERTIES--The student will be able to:

- 07.01 Describe the steelmaking process.
- 07.02 Describe the differences between ferrous and nonferrous metals.
- 07.03 Describe casting, alloys, and forging.
- 07.04 Identify metals such as galvanized iron and steel, aluminum, stainless steel, sheet metal, copper, and brass.
- 07.05 Identify properties of the most common metals.
- 07.06 Identify and describe common gages, shapes, and dimensions of purchased materials.

08.0 OPERATE METALWORKING MACHINES--The student will be able to:

- 08.01 Identify the purpose of various types of machine shop equipment.
- 08.02 Operate a drill press utilizing the correct drilling speed.
- 08.03 Operate a band saw utilizing the correct cutting speed.
- 08.04 Demonstrate clamping devices for securing stock for drilling.
- 08.05 Identify types and sizes of drill bits.
- 08.06 Use portable power saw equipment.
- 08.07 Use a cutoff or power hacksaw.
- 08.08 Use electric and air utility grinders.
- 08.09 Sharpen drill bits.
- 08.10 Select proper type of abrasive wheels for grinding machines.

09.0 PERFORM METAL FABRICATION OPERATIONS--The student will be able to:

- 09.01 Fabricate metal, edges, and seams.
- 09.02 Use hand tools to cut, punch, and shear metal.
- 09.03 Form sheet metal using a brake, a folder, rolls, and a shear.
- 09.04 Join metals using solder, rivets, and mechanical fasteners.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743030
Course Title: Engineering Assisting 3
Course Credit: 1

COURSE DESCRIPTION:

10.0 PERFORM GAS WELDING AND CUTTING OPERATIONS--The student will be able to:

- 10.01 Identify welding cylinders, regulators, hoses, pressure gages, and torches.
- 10.02 Describe welding equipment safety procedures.
- 10.03 Demonstrate proper flame settings.
- 10.04 Demonstrate basic gas welding skills.
- 10.05 Demonstrate procedures for adjusting and operating the oxyacetylene cutting torch.
- 10.06 Demonstrate freehand and guide cutting of various metal thickness.

11.0 PERFORM ELECTRIC METAL-BONDING OPERATIONS--The student will be able to:

- 11.01 Describe and demonstrate the spot and arc welding process.
- 11.02 Demonstrate basic procedures for safely adjusting and operating an arc welder, selecting a rod, striking and maintaining an arc, welding in various positions, and clamping.
- 11.03 Set up and operate a spot welder.
- 11.04 Explain and demonstrate the MIG welding process.
- 11.05 Apply basic procedures for safely adjusting, operating, cleaning, and maintaining MIG welding equipment.
- 11.06 Apply basic procedures for safely adjusting and operating a TIG welder, welding in various positions, selecting proper tips, and choosing filler metal.

12.0 PERFORM BENCH WORK SKILLS--The student will be able to:

- 12.01 Cut materials by using hand hacksaws.
- 12.02 Cut threads by using hand taps.
- 12.03 Cut threads by using dies.
- 12.04 Repair threads by chasing and thread inserts.
- 12.05 Ream holes by using hand reamers.
- 12.06 Hand-sharpen cutting tools by using abrasive stones.
- 12.07 Hone and lap surfaces.
- 12.08 Remove damaged screws and other hardware.
- 12.09 Deburr workpieces.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743040
Course Title: Engineering Assisting 4
Course Credit: 1

COURSE DESCRIPTION:

13.0 DEMONSTRATE KNOWLEDGE OF BASIC ELECTRICITY AND ELECTRONICS--The student will be able to:

13.01 Define electrical/electronic terms.
13.02 Explain the theory and application of magnetism.
13.03 Explain Ohm's Law.
13.04 Describe DC and AC circuits.
13.05 Demonstrate an entry-level understanding of electrical control equipment.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743050
Course Title: Engineering Assisting 5
Course Credit: 1

COURSE DESCRIPTION:

14.0 DEMONSTRATE PROFICIENCY IN REPAIRING AND MAINTAINING BASIC TWO-STROKE CYCLE ENGINES--The student will be able to:

14.01 Explain the basic principles of the operation of the two-stroke cycle internal combustion engine.
14.02 Identify types of engines.
14.03 Locate engine serial and model numbers.
14.04 Identify engine assemblies and systems.
14.05 Disassemble engines.
14.06 Remove, clean, and inspect the head for cracks, warpage, and damaged spark plug threads.
14.07 Remove, clean, and inspect piston rods and assemblies.
14.08 Measure out-of-round and cylinder taper.
14.09 Check the total bearing surface of connecting rod bearings.
14.10 Measure piston skirts and ring grooves.
14.11 Measure the piston ring gap in the cylinder bore.
14.12 Accurately fit piston to cylinder.
14.13 Install piston pins according to manufacturer's specification.
14.14 Check rod and piston assembly alignment.
14.15 Install rings on pistons.
14.16 Install piston rod assemblies.
14.17 Check needle bearings.
14.18 Inspect crankshafts and install seals.
14.19 Inspect, clean, and/or replace reed valves.
14.20 Reassemble engines.

15.0 DEMONSTRATE PROFICIENCY IN REPAIRING AND MAINTAINING BASIC FOUR-STROKE CYCLE ENGINES--The student will be able to:

15.01 Explain the basic principles of the operation of the four-stroke cycle internal combustion engine.
15.02 Identify types of four-stroke cycle engines.
15.03 Locate engine serial and model numbers.
15.04 Identify engine assemblies and systems.
15.05 Disassemble engines.
15.06 Clean and inspect heads for cracks, warpage, and damaged spark plug threads.
15.07 Inspect valves for warpage, burns, cracks, stem wear, tip wear, and margin.
15.08 Grind valve seats and reface valves.
15.09 Check and inspect springs for free height, distortion, and installed height.
15.10 Adjust valve lash.
15.11 Remove and inspect camshafts and lifters.
15.12 Measure camshafts.
15.13 Service camshaft bearings.
15.14 Clear and inspect lifters for wear.
15.15 Time valve drive assemblies.

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15.16 Remove piston from rods assemblies.
15.17 Measure out-of-round and cylinder taper with a dial bore gage or micrometer.
15.18 Check piston pins and bosses for wear.
15.19 Measure piston ring lands width, out-of-round, and taper.
15.20 Measure the piston ring gap in the cylinder bore.
15.21 Install and fit piston pins.
15.22 Check rod and piston assembly alignment.
15.23 Remove and replace rod bearings.
15.24 Hone and clean cylinders.
15.25 Install rings on pistons.
15.26 Measure and check crankshafts with a micrometer.
15.27 Check for end play.
15.28 Check the bearing bore with a telescoping gage using special tools provided by the engine manufacturer.
15.29 Reassemble engines.
15.30 Install oil seals.

16.0 DEMONSTRATE PROFICIENCY IN MAINTAINING AND REPAIRING DIESEL ENGINES--The student will be able to:

16.01 Identify diesel engine operating principles (two- and four-stroke cycle engines).
16.02 Identify components of two- and four-stroke cycle engines.
16.03 Troubleshoot and repair cooling systems.
16.04 Troubleshoot and repair lubrication systems.
16.05 Troubleshoot and repair induction and exhaust systems.

17.0 MAINTAIN DRIVE COMPONENTS--The student will be able to:

17.01 Demonstrate safety procedures for maintaining drive components.
17.02 Identify types of bearings.
17.03 Remove, inspect, and/or replace bearings.
17.04 Remove and replace seals.
17.05 Perform shaft alignment.
17.06 Identify types of belts.
17.07 Identify types of chains.
17.08 Perform tension adjustments on belt and chain drives.
17.09 Troubleshoot belts and chain drives.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743060
Course Title: Engineering Assisting 6
Course Credit: 1

COURSE DESCRIPTION:

18.0 MAINTAIN PIPING AND TUBING--The student will be able to:

- 18.01 Identify components of a piping system.
- 18.02 Explain maintenance considerations of metallic and non-metallic piping system.
- 18.03 Join copper tubing.
- 18.04 Join common fittings.
- 18.05 Join metallic pipe.
- 18.06 Join plastic pipe.
- 18.07 Explain valve operation and maintenance.

19.0 TROUBLESHOOT HYDRAULIC AND PNEUMATIC SYSTEMS--The student will be able to:

- 19.01 Explain safety procedures for troubleshooting hydraulic and pneumatic systems.
- 19.02 Read hydraulic and pneumatic schematics.
- 19.03 Explain hydraulic and pneumatic troubleshooting techniques.
- 19.04 Install hydraulic and pneumatic system components.
- 19.05 Troubleshoot, repair, and install valves.
- 19.06 Troubleshoot air compressors and hydraulic pumps.

20.0 HANDLE AND APPLY LUBRICANTS--The student will be able to:

- 20.01 Explain the functions of lubrication.
- 20.02 Explain the properties of oil lubricants and factors determining the selection of lubricants.
- 20.03 Identify the types, advantage, and functions of lubricant additives.
- 20.04 Identify grease application.
- 20.05 Identify lubricating systems and methods.
- 20.06 Explain lubricant storage and handling methods.
- 20.07 Lubricate a piece of industrial equipment.

21.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 21.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 21.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 21.03 Read and follow written and oral instructions.
- 21.04 Answer and ask questions coherently and concisely.
- 21.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 21.06 Demonstrate appropriate telephone/communication skills.

22.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

22.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
22.02 Draw conclusions or make inferences from data.
22.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
22.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

23.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

23.01 Conduct a job search.
23.02 Secure information about a job.
23.03 Identify documents which may be required when applying for a job interview.
23.04 Complete a job application form correctly.
23.05 Demonstrate competence in job interview techniques.
23.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, and other employees.
23.07 Identify acceptable work habits.
23.08 Demonstrate knowledge of how to make appropriate job changes.
23.09 Demonstrate acceptable employee health habits.
23.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

24.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

24.01 Define entrepreneurship.
24.02 Describe the importance of entrepreneurship to the American economy.
24.03 List the advantages and disadvantages of business ownership.
24.04 Identify the risks involved in ownership of a business.
24.05 Identify the necessary personal characteristics of a successful entrepreneur.
24.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Engineering Related Technology
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I159999**
CIP Number	0615.999900
Grade Level	30, 31
Length	450 hours
Certification	ANY INDUS ED G
	ANY TECHNICAL ED G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare individuals for advanced training that may result in employment as mechanical engineering technicians (22511236) or mechanical equipment engineering assistants (007.161-018). This program also provides supplemental training for persons previously or currently employed in these occupations.

The course content will include the following: engineering related general education skills (English, mathematics, physics); tools, machinery, drafting skills; familiarity with working drawings and blueprints; technical recording and reporting; and an assortment of miscellaneous engineering related skills to provide a broad base of knowledge which will support advanced training in specialty areas.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Engineering industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: recording and reporting of engineering data; the application of problem solving techniques and mathematically-derived solutions to engineering problems or projects; production of engineering drawings and working drawings; the preparation of bills of materials from engineering or shop drawings; the application of appropriate engineering codes and specifications; the preparation of data or laboratory logbooks; the application of principles of physics, and practical experience in the application of safety principles and procedures.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 9.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 450 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate engineering related English skills.
02.0 Apply engineering related mathematical concepts and perform engineering related calculations.
03.0 Demonstrate engineering related applied physics skills.
04.0 Apply and use safety rules and standards.
05.0 Apply engineering related shop or laboratory skills.
06.0 Demonstrate knowledge and use of engineering related tools, machinery and equipment.
07.0 Apply engineering related basic drafting skills.
08.0 Demonstrate a basic knowledge of engineering related working drawings.
09.0 Demonstrate engineering related computer assisted drafting skills.
10.0 Demonstrate proficiency in engineering related technical recording and reporting.
11.0 Demonstrate and apply knowledge of miscellaneous engineering related skills.
12.0 Demonstrate employability skills.
13.0 Demonstrate understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Engineering Related Technology
Secondary Number:
Postsecondary Number: I159999

01.0 DEMONSTRATE ENGINEERING RELATED ENGLISH SKILLS--The student will be able to:

01.01 Identify and define frequently used engineering related terms.
01.02 Determine the main idea of engineering related memos and instructions.
01.03 Identify and list the order of events in a set of engineering specifications.
01.04 Write a statement of how to follow a given set of written instructions.
01.05 Obtain appropriate engineering related information from pictures, maps or signs.
01.06 Demonstrate basic engineering related English writing skills.
01.07 Write an engineering related request for personnel, materials or supplies, information, notation of assignment and change order.
01.08 Write a clear, concise and sequenced series of brief statements describing the steps of an engineering related process or event.
01.09 Use a proper form when writing a simple engineering related business letter and addressing an envelope for it.
01.10 Write an engineering related letter of request, adjustment, complain, application or opinion which contains necessary and accurate information.
01.11 Proofread engineering related reports for spelling.
01.12 Write an engineering related memorandum using a proper format.

02.0 APPLY ENGINEERING RELATED MATHEMATICAL CONCEPTS AND PERFORM ENGINEERING RELATED CALCULATIONS--The student will be able to:

02.01 Solve basic mathematic problems.
02.02 Solve basic algebraic problems.
02.03 Solve basic geometric problems.
02.04 Solve basic trigonometric problems.
02.05 Define physical constant as used in mathematical equations.
02.06 Define mathematical constant as used in mathematical equations.
02.07 Define independent variable as used in mathematical equations.
02.08 Define dependent variable as used in mathematical equations.
02.09 Write the basic mathematical formula stating the relationship of force, pressure and area.
02.10 Write the basic mathematical formula stating the relationship of weight, mass and acceleration of gravity.
02.11 Write the basic mathematical formula stating the relationship of voltage, current and electrical resistance.
02.12 Distinguish between fundamental and derived units and give examples of each from the Internationai System of units (SI) and English units.
02.13 Explain the terms "dimensionless quantity" and "radian".
02.14 Name the seven basic SI units and give the symbol and quantity measured for each.

02.15 Name the two supplementary SI units and give the symbol and quantity measured for each.
02.16 List the derived SI unit and its symbol for frequency.
02.17 Write, in the accepted notation, expressions indicating the products, quotients and reciprocals of given SI units.
02.18 Convert lengths in feet and inches to the equivalent length in SI units.
02.19 Calculate a weight in pounds, given a mass in kilograms.
02.20 Identify the term angle.
02.21 Apply the Pythagorean theorem to determine the third side of a triangle when given a right triangle with two known sides.
02.22 Add and subtract two or more given vector quantities graphically, with the aid of a scale and protractor.
02.23 Resolve a vector graphically, given the vector quantity with magnitude and direction specified and with the aid of a scale and protractor.
02.24 Draw a technically acceptable graph from a table of experimental data suitable for plotting on rectangular-coordinate graph paper.
02.25 Write a given decimal number in scientific notation.
02.26 Write a number given in scientific notation in decimal form.
02.27 Multiply and divide numbers and solve equations using the three theorems of logarithms for products and quotients.
02.28 Measure linear dimensions with a vernier caliper to the nearest 0.1 mm and with a micrometer caliper to the nearest 0.001 mm.

03.0 DEMONSTRATE ENGINEERING RELATED APPLIED PHYSICS SKILLS--The student will be able to:

03.01 Demonstrate applied skills in mechanics.
03.02 Apply and solve vectors.
03.03 Solve force and motion problems.
03.04 Solve work, energy and power problems.
03.05 Solve friction problems.
03.06 Solve circular motion problems.
03.07 Solve rotational motion problems.
03.08 Solve problems involving the properties of solids.
03.09 Solve problems involving the properties of liquids.
03.10 Solve problems involving the properties of gases.
03.11 Demonstrate applied skills in heat, light and sound.
03.12 Solve temperature and heat problems.
03.13 Solve change-of-state problems.
03.14 Solve heat transfer problems.
03.15 Solve thermodynamic problems.
03.16 Solve refrigeration and air conditioning problems.
03.17 Solve harmonic motion problems.
03.18 Solve sound wave problems.
03.19 Solve light problems.
03.20 Solve optical problems.
03.21 Demonstrate applied skills in electricity and magnetism.
03.22 Solve electric circuit problems.
03.23 Solve electromagnetic problems.
03.24 Solve alternating current problems.
03.25 Solve generator and motor problems.
03.26 Solve electrostatic problems.
03.27 Solve magnetism problems.
03.28 Apply knowledge of strengths of materials.
03.29 Solve equilibrium problems.
03.30 Solve stress and strain problems.
03.31 Solve centroid and inertia problems.

03.32 Solve connection and joint problems.
03.33 Solve problems with beam stresses.
03.34 Solve torsion problems.
03.35 Solve compression problems.
03.36 Solve tension problems.
03.37 Solve force combination problems.

04.0 APPLY AND USE SAFETY RULES AND STANDARDS--The student will be able to:

04.01 Demonstrate knowledge and use of general safety rules.
04.02 Apply general shop or laboratory safety rules and procedures.
04.03 Demonstrate the operation of shop safety devices.
04.04 Apply fire safety rules and procedures.
04.05 Apply rules and procedures for electrical safety.
04.06 Apply safety rules and procedures for installing or using control panels or other electromechanical or electronic devices.
04.07 Apply safety rules and procedures applicable to stationary or moving machinery and the use and maintenance of machine safety guards.
04.08 Apply safety rules and procedures applicable to the use of moving transports (forklifts, conveyors, small electric trucks and flatbeds, etc.) and those to be followed where such transport is being operated.
04.09 Apply safety rules and procedures to be followed when operating or using hoists, cranes, elevators and other lifting equipment.
04.10 Apply safety rules and procedures to be follow when constructing or using scaffolding.
04.11 Demonstrate safety procedures to be followed in areas where heavy equipment (earth haulers, dump trucks, cranes, scrapers, bulldozers, various heavy trucks, etc.) is being operated.
04.12 Identify safety headgear and where, how and why it is to be used.
04.13 Identify safety straps and belts and where, how and why they are to be used.
04.14 Identify safety clothing (gloves, nets, aprons, goggles, soft-soled shoes or caulked boots, etc.) and where, how and why it is to be used.
04.15 Determine and demonstrate how to apply the Occupational Safety Health Administration (OSHA) regulations regarding manufacturing enclosures and machinery.

05.0 APPLY ENGINEERING RELATED SHOP OR LABORATORY SKILLS--The student will be able to:

05.01 Apply appropriate reading and writing skills in the writing and preparation of shop or laboratory reports or logbooks and in the technical recording and reporting of shop or laboratory data.
05.02 Apply appropriate mathematical concepts and calculations to solve given shop or laboratory projects or assignments.
05.03 Apply appropriate physics concepts and calculations in the solution of given shop or laboratory projects or assignments.
05.04 Apply appropriate safety rules, regulations and procedures in a shop or laboratory setting.
05.05 Apply basic drafting skills to the solution of engineering related problems or the accumulation and presentation of engineering data in a ship or laboratory setting.
05.06 Apply knowledge of working drawings to produce usable shop or laboratory drawings for various engineering fields and to draw

off representative bills of materials from given working drawings.

05.07 Demonstrate the ability to research, locate and apply the appropriate codes to given engineering problems when presented in a shop or laboratory situation.

06.0 DEMONSTRATE KNOWLEDGE AND USE OF ENGINEERING RELATED TOOLS, MACHINERY, AND EQUIPMENT--The student will be able to:

06.01 Identify and explain the use of the hand tools used in the construction industries (carpentry, masonry, plumbing, welding, wiring, etc.).

06.02 Identify and explain the use of the smaller power tools used in the construction industries (carpentry, masonry, plumbing, welding, wiring, etc.).

06.03 Identify and explain the use of the larger tools and machinery used in the construction industries (carpentry, masonry, plumbing, welding, wiring, etc.).

06.04 Identify and explain the use of the heavy machinery and equipment used in the construction industries (carpentry, masonry, plumbing, welding, wiring, etc.).

07.0 APPLY ENGINEERING RELATED BASIC DRAFTING SKILLS--The student will be able to:

07.01 Use basic drafting tools and equipment.
07.02 Demonstrate the proper use and care of drawing equipment.
07.03 Select proper drawing instruments to complement the drafting media (mylar, vellum, etc.).
07.04 Select correct pencils or pens to draw proper line weights.
07.05 Use reproduction techniques and materials to construct a tracing.
07.06 Produce sepia, blueline, mylar and electrostatic copies.
07.07 Make Diazo (Ozalid) copies of original drawings.
07.08 Set up a drafting machine and drafting equipment.
07.09 Construct borders, information blocks and center drawings.
07.10 Construct freehand sketches.
07.11 Read and transfer measurements.
07.12 Letter freehand (letters and numerals).
07.13 Draw intersections of lines and planes.
07.14 Letter with mechanical lettering devices and templates.
07.15 Apply established drafting standards.
07.16 Construct regular polygons and ellipses.
07.17 Draw tangents to arcs, lines and circles.
07.18 Construct involutes.
07.19 Draw intersections of solids.
07.20 Prepare a simple orthographic drawing.
07.21 Identify the use and application of orthographic drawings.
07.22 Draw simple auxiliary views or revolutions.
07.23 Draw simple sectional views or conventions.
07.24 Identify the symbols used to represent different materials.
07.25 Apply dimensioning practices and techniques to drawings.
07.26 Construct the lines used to dimension drawings.
07.27 Identify the use and application of dimensioning practices.
07.28 Apply conventional tolerances.
07.29 Read and convert measurements.
07.30 Construct simple pictorial drawings.
07.31 Construct simple isometric drawings.
07.32 Construct simple oblique drawings.
07.33 Identify the use and application of pictorial drawings.

07.34 Construct a simple perspective drawing.
07.35 Construct several types of simple graphic charts.
07.36 Identify the use and application of graphic charts.

08.0 DEMONSTRATE A BASIC KNOWLEDGE OF ENGINEERING RELATED WORKING DRAWINGS--The student will be able to:

08.01 Construct drafting symbols.
08.02 Produce simple representative engineering drawings.
08.03 Draw off and prepare bills of materials.

09.0 DEMONSTRATE ENGINEERING RELATED COMPUTER ASSISTED DRAFTING SKILLS--The student will be able to:

09.01 Operate computer assisted drafting (CAD) equipment and peripherals.
09.02 Demonstrate data base management skills.
09.03 Perform applied CAD basic drafting skills.
09.04 Generate simple isometric views.
09.05 Generate simple assemblies, details and schematics.
09.06 Apply notes and special instructions.
09.07 Manipulate views.
09.08 Apply scaling.
09.09 Apply dimensioning.
09.10 Develop simple three-dimensional drawings.
09.11 Select appropriate line weight.
09.12 Generate simple layouts.
09.13 Demonstrate data processing management skills.
09.14 Develop execute lists using command language.
09.15 Write a simple FORTRAN program.
09.16 Interpret printed output.
09.17 Demonstrate post-processing file management skills.

10.0 DEMONSTRATE PROFICIENCY IN ENGINEERING RELATED TECHNICAL RECORDING AND REPORTING--The student will be able to:

10.01 Create and interpret schematics.
10.02 Record data and design curves and graphs.
10.03 Write reports and make oral presentations.
10.04 Maintain test and engineering data logs.
10.05 Make equipment failure reports.
10.06 Specify and requisition simple parts and supplies.
10.07 Compose technical letters and memoranda.
10.08 Write formal reports of laboratory experiences.
10.09 Draft preventive maintenance and calibration procedures.

11.0 DEMONSTRATE AND APPLY KNOWLEDGE OF MISCELLANEOUS ENGINEERING RELATED SKILLS--The student will be able to:

11.01 Demonstrate knowledge and use of practical geology and soils.
11.02 Apply the ability to create engineering related program education and review technique (PERT) charts to the scheduling of a simple hypothetical engineering project.
11.03 Apply the ability to create engineering related critical path method (CPM) charts to the scheduling of a simple hypothetical engineering project.
11.04 Apply the ability to create engineering related Gantt charts or lists to the scheduling of a simple hypothetical engineering project.

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11.05 Demonstrate knowledge and use of slide rules, calculators and other general engineering related tools.
11.06 Demonstrate knowledge and use of engineering related reference materials.
11.07 Demonstrate the ability to read and interpret engineering related blueprints.
11.08 Demonstrate knowledge and ability in engineering related problem-solving.
11.09 Demonstrate knowledge and use of engineering related trade terms and terminology.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Identify documents that may be required when applying for a job.
12.04 Complete a job application form correctly.
12.05 Demonstrate competence in job interview techniques.
12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
12.07 Identify acceptable work habits.
12.08 Demonstrate knowledge of how to make job changes appropriately.
12.09 Demonstrate acceptable employee health habits.
12.10 Demonstrate a knowledge of the "Florida Right-to-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.
13.05 Identify the necessary personal characteristics of a successful entrepreneur.
13.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Film Production Equipment Operations
Occupational Area:	Industrial Education
	PSAV
Program Numbers	I100112
CIP Number	0610.010201
Grade Level	30, 31
Length	1800 hours
Certification	TV PRO TEC @7 G
	TEC ELEC @7 G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for initial employment in film production equipment operation occupations, as camera assistants, sound equipment operators, editing equipment operators, set builders, grips and lighting equipment operators, or to provide supplemental training for persons previously or currently employed in these occupations.

The content should include, but not be limited to, instruction that prepares individuals to function as members of a technical team within the framework of an organized film production. Instruction includes: purchasing/renting, scheduling and the application of technical skills to solving unique shooting problems. Also included are skills relating to professionalism, employability, communication and supervision.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Film Production industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Production activities are an integral part of this program and provide practical application and instruction in the operation of equipment in areas of filming, lighting, sound, set construction, gripping and editing. In addition students will be exposed to production management, special effects, script supervision, casting, make-up, wardrobe and assistant directing.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

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In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 9.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

The typical length of this program for the average achieving student is 1800 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Construct and install theatrical scenery to the specifications required in a scene design for a film production.
02.0 Operate audio equipment for film productions.
03.0 Function as part of a technical support team in planning, implementing and running the technical aspects of film production.
04.0 Be knowledgeable of the interrelationship which exists between the various creative and craft skills required for film production.
05.0 Execute pre-production, production and post-production tasks for the area of gripping.
06.0 Execute the audio requirements for film production.
07.0 Execute pre-production, production and post-production tasks for the area of camera assisting.
08.0 Execute pre-production, production and post-production tasks for the area of film editing equipment operation.
09.0 Execute pre-production, production and post-production tasks for the area of film lighting.
10.0 Demonstrate appropriate communication skills.
11.0 Demonstrate appropriate math skills.
12.0 Demonstrate appropriate understanding of basic science.
13.0 Demonstrate employability skills.
14.0 Demonstrate an understanding of entrepreneurship.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Film Production Equipment Operations
Secondary Number:
Postsecondary Number: I100112

01.0 CONSTRUCT AND INSTALL THEATRICAL SCENERY TO THE SPECIFICATIONS REQUIRED IN A SCENE DESIGN FOR A FILM PRODUCTION--The student will be able to:

- 01.01 Purchase appropriate materials and hardware for scenic construction.
- 01.02 Construct common flat scenery.
- 01.03 Construct three-dimensional scenery.
- 01.04 Execute application techniques used in painting scenery.
- 01.05 Construct special effects scenery.
- 01.06 Schedule and organize transportation of scenery to remote locations.
- 01.07 Supervise scene shop activities.

02.0 OPERATE AUDIO EQUIPMENT FOR FILM PRODUCTIONS--The student will be able to:

- 02.01 Operate sound reinforcement systems to meet performance needs.
- 02.02 Operate various audio equipment to achieve proper sound mix on an audio mixer.
- 02.03 Perform transactions with audio suppliers.
- 02.04 Execute the design for proper microphone and speaker placement.

03.0 FUNCTION AS PART OF A TECHNICAL SUPPORT TEAM IN PLANNING, IMPLEMENTING AND RUNNING THE TECHNICAL ASPECTS OF FILM PRODUCTION--The student will be able to:

- 03.01 Perform as a member of a technical support team within the framework of an organized film production.
- 03.02 Execute job assignments in order to meet production deadlines.
- 03.03 Execute technical needs to apply accepted principles of film technology to production situation(s).

04.0 BE KNOWLEDGEABLE OF THE INTERRELATIONSHIP WHICH EXISTS BETWEEN THE VARIOUS CREATIVE AND CRAFT SKILLS REQUIRED FOR FILM PRODUCTION--The student will be able to:

- 04.01 Differentiate the working relationships which exist between the various participants involved in the film making process.
- 04.02 Demonstrate the proper use of standard film making forms.
- 04.03 Define the specific technical processes used by the camera, grip, lighting, sound, art, costume, special effects, make-up and editing.
- 04.04 Execute strategies for meeting the technical requirements of a film production crew.

05.0 EXECUTE PRE-PRODUCTION, PRODUCTION AND POST-PRODUCTION TASKS FOR THE AREA OF GRIPPING--The student will be able to:

- 05.01 Execute strategies to properly utilize grip equipment during film production.

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05.02 Accept directions in the placement of dollies, cranes and other camera mounts as required for film production.
05.03 Execute pre and post-production routines.
05.04 Work as a member of a film production team.
05.05 Develop appropriate industry contacts.
05.06 Demonstrate safe work habits.
05.07 Assist in determining grip equipment needs.
05.08 Execute required effects for lighting set-ups.

06.0 EXECUTE THE AUDIO REQUIREMENTS FOR FILM PRODUCTION--The student will be able to:

06.01 Execute strategies for recording production film sound to acceptable industry standards.
06.02 Record production and post-production sound.
06.03 Work as a member of a film production team.
06.04 Develop appropriate industry contacts.
06.05 Assist in analyzing audio needs for film production to perform transactions with suppliers.

07.0 EXECUTE PRE-PRODUCTION, PRODUCTION AND POST-PRODUCTION TASKS FOR THE AREA OF CAMERA ASSISTING--The student will be able to:

07.01 Assist in the execution of shooting activities using standard industry camera equipment.
07.02 Assist in shooting activities required for appropriate camera department documentation.
07.03 Execute the proper care and handling of camera and camera assist equipment.
07.04 Work as a member of a film production team.
07.05 Develop appropriate industry contacts.
07.06 Assist in analyzing production requirements to determine camera equipment needs.

08.0 EXECUTE PRE-PRODUCTION, PRODUCTION AND POST-PRODUCTION TASKS FOR THE AREA OF FILM EDITING EQUIPMENT OPERATION--The student will be able to:

08.01 Operate editing equipment.
08.02 Execute standard editing room routines.
08.03 Execute required editing room documentation.
08.04 Work as a member of a film production team.
08.05 Develop appropriate industry contacts.
08.06 Work with suppliers and film laboratories.
08.07 Execute editing sequences using industry standard equipment.

09.0 EXECUTE PRE-PRODUCTION, PRODUCTION AND POST-PRODUCTION TASKS FOR THE AREA OF FILM LIGHTING--The student will be able to:

09.01 Utilize standard film lighting equipment to production specifications.
09.02 Execute power distribution system for film lighting equipment.
09.03 Execute pre and post-production routines necessary for the lighting department.
09.04 Work as a member of a film production team.
09.05 Create a safe working environment.
09.06 Develop appropriate industry contacts.
09.07 Execute production requirements to determine lighting equipment and maintenance needs.
09.08 Execute required lighting effects for film shooting.
09.09 Hang, connect and focus lights for a production.

10.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

10.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
10.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
10.03 Read and follow written and oral instructions.
10.04 Answer and ask questions coherently and concisely.
10.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
10.06 Demonstrate appropriate telephone/communication skills.

11.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

11.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
11.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
11.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
11.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
11.05 Demonstrate an understanding of federal, state and local taxes and their computation.

12.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

12.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
12.02 Draw conclusions or make inferences from data.
12.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
12.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

13.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

13.01 Conduct a job search.
13.02 Secure information about a job.
13.03 Identify documents that may be required when applying for a job.
13.04 Complete a job application form correctly.
13.05 Demonstrate competence in job interview techniques.
13.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
13.07 Identify acceptable work habits.
13.08 Demonstrate knowledge of how to make appropriate job changes.
13.09 Demonstrate acceptable employee health habits.
13.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

14.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

14.01 Define entrepreneurship.

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14.02 Describe the importance of entrepreneurship to the American economy.
14.03 List the advantages and disadvantages of business ownership.
14.04 Identify the risks involved in ownership of a business.
14.05 Identify the necessary personal characteristics of a successful entrepreneur.
14.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Film Production Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0610.010200
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as film production technicians, initial employment as camera operators, sound mixers, editors, editing assistants, set designers, key grips, gaffers, and best boys or to provide supplemental training for persons previously or currently employed in these occupations.

The content should include, but not be limited to, instruction that prepares individuals to function as members of a technical team within the framework of an organized film/video production. Instruction includes: production analysis, interpretation, purchasing/renting, scheduling and the application of production skills to solving unique shooting problems. Also included are skills relating to professionalism, employability, communication and management.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Film Production industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Production activities are an integral part of this program and provide practical application and instruction in the areas of camera, lighting, sound, set construction, gripping and editing. In addition students will be exposed to other related skill areas such as, but not limited to, production management, special effects, script supervision, casting, make up, wardrobe and assistant directing.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum

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content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Design and supervise the construction and installation of theatrical scenery to the specifications required in a scene for a film or video production.
02.0 Formulate strategies for audio reinforcement for film/video productions.
03.0 Create a "sound track" for theatrical/film productions.
04.0 Supervise the hanging, focusing and circuiting of stage lights to the specifications required in lighting designs.
05.0 Function as part of a technical team in planning, implementing and running the technical aspects of theatrical/film productions.
06.0 Interpret the interrelationship which exists between the various creative and craft skills required for film/video production.
07.0 Analyze and implement pre-production, production and post-production tasks for the area of gripping.
08.0 Interpret and implement the audio requirements for film production.
09.0 Analyze and execute pre-production, production and post-production tasks for the area of camera.
10.0 Analyze and execute pre-production, production and post-production tasks for the area of film/video editing.
11.0 Analyze and execute pre-production, production and post-production tasks for the area of film lighting.
12.0 Organize and implement, as part of a technical team, a motion picture production.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate appropriate math skills.
15.0 Demonstrate appropriate understanding of basic science.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Film Production Technology
Secondary Number:
Postsecondary Number: 0610.010200

01.0 DESIGN AND SUPERVISE THE CONSTRUCTION AND INSTALLATION OF THEATRICAL SCENERY TO THE SPECIFICATIONS REQUIRED IN A SCENE FOR A FILM OF VIDEO PRODUCTION--The student will be able to:

- 01.01 Design and draft scenic plans to scale.
- 01.02 Interpret scenic plans for the appropriate use of materials and hardware for scenic construction.
- 01.03 Formulate design strategies for the construction of common flat scenery.
- 01.04 Formulate design strategies for the construction of three-dimensional scenery.
- 01.05 Translate scene design needs into application techniques used in painting scenery.
- 01.06 Create special effects scenery.
- 01.07 Schedule and organize transportation of scenery to remote locations.
- 01.08 Supervise scene shop activities.

02.0 FORMULATE STRATEGIES FOR AUDIO REINFORCEMENT OF FILM/VIDEO PRODUCTIONS--The student will be able to:

- 02.01 Evaluate performance needs.
- 02.02 Evaluate technical resources as appropriate to given spaces.
- 02.03 Configure and operate sound reinforcement systems to meet performance needs.
- 02.04 Analyze various audio qualities to achieve proper sound mix on an audio mixer.
- 02.05 Perform transactions with audio suppliers.
- 02.06 Design a plot for proper microphone and speaker placement.

03.0 CREATE A "SOUND TRACK" FOR THEATRICAL/FILM PRODUCTIONS--The student will be able to:

- 03.01 Select sound material.
- 03.02 Compose, by recording and editing, a sound tape for theatrical/broadcast productions.
- 03.03 Supervise the operation of sound system components as required for both reinforcement and effects applications.
- 03.04 Design mechanical and electrical sound effects for productions.
- 03.05 Evaluate the quality of sound cue execution in recorded and live performance.

04.0 SUPERVISE THE HANGING, FOCUSING AND CIRCUITING OF STAGE LIGHTS TO THE SPECIFICATIONS REQUIRED IN LIGHTING DESIGNS--The student will be able to:

- 04.01 Design a standard lighting plot.
- 04.02 Analyze and document lighting requirements for production.
- 04.03 Supervise hanging, circuiting and focusing lights for a production.
- 04.04 Manage lighting area operations.

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04.05 Schedule lighting area.
04.06 Distinguish various applications of stage lighting equipment.
04.07 Appraise maintenance needs for lighting equipment.
04.08 Design special-effects lighting.

05.0 FUNCTION AS PART OF A TECHNICAL TEAM IN PLANNING, IMPLEMENTING, AND RUNNING THE TECHNICAL ASPECTS OF THEATRICAL/FILM PRODUCTIONS--The student will be able to:

05.01 Perform as a member of a technical team within the framework of an organized theater/film production.
05.02 Supervise job assignments in order to meet production deadlines.
05.03 Interpret technical needs to apply accepted principles of theater/film technology to production situation(s).
05.04 Adapt learned skills and generate new approaches in order to solve unique production problems.

06.0 INTERPRET THE INTERRELATIONSHIP WHICH EXISTS BETWEEN THE VARIOUS CREATIVE AND CRAFT SKILLS REQUIRED FOR FILM/VIDEO PRODUCTION--The student will be able to:

06.01 Differentiate the working relationships which exist between the various participants involved in the film making process.
06.02 Demonstrate the proper use of standard film making forms.
06.03 Analyze a film script for its technical requirements.
06.04 Define the specific technical processes used by the camera, grip, lighting, sound, art, costume, special effects, make up and editing departments.
06.05 Propose strategies for meeting the technical requirements of a film production crew.
06.06 Compare the techniques used in film and video production.

07.0 ANALYZE AND IMPLEMENT PRE-PRODUCTION, PRODUCTION AND POST-PRODUCTION TASKS FOR THE AREA OF GRIPPING--The student will be able to:

07.01 Formulate strategies to properly utilize grip equipment during film/video production.
07.02 Translate script needs into creative uses of dollies, cranes and other camera mounts as required for film and video production.
07.03 Originate solutions to unique shooting problems.
07.04 Organize pre and post-production routines.
07.05 Analyze a script for its technical requirements.
07.06 Work as a member of a film production team.
07.07 Develop appropriate industry contacts.
07.08 Demonstrate safe work habits.
07.09 Analyze production requirements to determine grip equipment needs.
07.10 Create required effects for lighting set-ups.

08.0 INTERPRET AND IMPLEMENT THE AUDIO REQUIREMENTS FOR FILM PRODUCTION--The student will be able to:

08.01 Formulate strategies for recording production film sound to acceptable industry standards.
08.02 Record production and post-production sound.
08.03 Design sound score appropriate to production and post-production needs.

08.04 Organize pre and post-production routines necessary for the sound department.
08.05 Correctly interpret script information relative to film sound.
08.06 Work as a member of a film production team.
08.07 Develop appropriate industry contacts.
08.08 Analyze audio needs for film production to perform transactions with suppliers.

09.0 ANALYZE AND EXECUTE PRE-PRODUCTION, PRODUCTION AND POST-PRODUCTION TASKS FOR THE AREA OF CAMERA--The student will be able to:

09.01 Analyze the aesthetic needs of a shot and accomplish them by using standard industry camera equipment.
09.02 Interpret shooting activities required for appropriate camera department documentation.
09.03 Organize the proper care and handling of camera and camera assist equipment.
09.04 Analyze the script for camera lens and shot requirements.
09.05 Organize pre and post-production routines for film camera operation.
09.06 Work as a member of a film production team.
09.07 Develop appropriate industry contacts.
09.08 Analyze production requirements to determine camera equipment needs.

10.0 ANALYZE AND EXECUTE PRE-PRODUCTION, PRODUCTION AND POST-PRODUCTION TASKS FOR THE AREA OF FILM/VIDEO EDITING--The student will be able to:

10.01 Interpret script materials for the best editing choices.
10.02 Organize standard editing room routines.
10.03 Execute required editing room documentation.
10.04 Work as a member of a film production team.
10.05 Develop appropriate industry contacts.
10.06 Analyze editing needs to perform transactions with suppliers and film laboratories.
10.07 Compose editing sequences using industry standard equipment.

11.0 ANALYZE AND EXECUTE PRE-PRODUCTION, PRODUCTION AND POST-PRODUCTION TASKS FOR THE AREA OF FILM LIGHTING--The student will be able to:

11.01 Formulate strategies to utilize standard film lighting equipment to production specifications.
11.02 Design and implement a power distribution system for film lighting equipment.
11.03 Organize pre and post-production routines necessary for the lighting department.
11.04 Work as a member of a film production team.
11.05 Create a safe working environment.
11.06 Develop appropriate industry contacts.
11.07 Analyze production requirements to determine lighting equipment needs.
11.08 Create required lighting effects for film shooting.

12.0 ORGANIZE AND IMPLEMENT, AS PART OF A TECHNICAL TEAM, A MOTION PICTURE PRODUCTION--The student will be able to:

12.01 Function as a member of a technical team within the framework of an organized film production.
12.02 Manage resources in order to meet production deadlines.

12.03 Analyze job needs and perform transactions with rental houses and suppliers.
12.04 Apply accepted principles of film technology to production situation(s).
12.05 Interpret a film script and storyboard for their production requirements.
12.06 Evaluate learned skills in order to generate new approaches for solving unique production problems.
12.07 Manage production crews.
12.08 Develop appropriate industry contacts.
12.09 Formulate and implement a production plan in the areas of syncsound, camera, grip, electrical, sound, art direction, post-production, special effects, wardrobe, makeup, assistant direction, casting, script supervision and production management.

13.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

13.01 Conduct a job search.
13.02 Secure information about a job.
13.03 Identify documents that may be required when applying for a job.
13.04 Complete a job application form correctly.
13.05 Demonstrate competence in job interview techniques.
13.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
13.07 Identify acceptable work habits.
13.08 Demonstrate knowledge of how to make job changes appropriately.
13.09 Demonstrate acceptable employee health habits.
13.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

14.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

14.01 Define entrepreneurship.
14.02 Describe the importance of entrepreneurship to the American economy.
14.03 List the advantages and disadvantages of business ownership.
14.04 Identify the risks involved in ownership of a business.
14.05 Identify the necessary personal characteristics of a successful entrepreneur.
14.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Floor Covering Installation
Occupational Area: Industrial Education

	Secondary	PSAV
Program Numbers	**8721400**	**I460405**
CIP Number	0646.040500	0646.040500
Grade Level	9-12, 30, 31	30, 31
Length	3 credits	450 hours
Certification	TEC CONSTR ¶7 ¶G	TEC CONSTR ¶7 ¶G
	BLDG CONST ¶7 ¶G	BLDG CONST ¶7 ¶G
	FLOORING @7 G	FLOORING @7 G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as a floor covering installer, or to provide supplemental training for persons previously or currently employed in this occupation.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, classroom instruction and shop experiences in the preparation of floors for the layout, measuring, cutting, sewing, of sound-deadening or decorative covering for floors and walls. The preparation of floors for, and the layout, measuring, cutting and installation of linoleum and vinyl sheet floor covering and tile are included.

Listed below are the courses that comprise this program when offered at the secondary level:

8721410 - Floor Covering Installation 1
8721420 - Floor Covering Installation 2
8721430 - Floor Covering Installation 3

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Floor Covering industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program and provide instruction in the basic hand tools and equipment including knee kickers, seaming irons, power stretchers, strippers, tile cutters, hand binding staplers, and hammer drills.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and

employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 7.0, Language 7.0, Reading 8.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

When this program is offered at the postsecondary level it may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The particular outcomes and student performance standards which the handicapped student must master to earn credit must be specified in the student's Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

The typical length of this program for the average achieving student is 450 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate safe and efficient work practices.
02.0 Interpret blueprints and specifications.
03.0 Select, care for and use tools and materials.
04.0 Demonstrate sketching, measuring, and drawing proficiency.
05.0 Demonstrate knowledge of material and cost estimates.
06.0 Demonstrate knowledge of current industry standards, practices and techniques.
07.0 Demonstrate appropriate communication skills.
08.0 Demonstrate appropriate math skills.
09.0 Demonstrate appropriate understanding of basic science.
10.0 Demonstrate employability skills.
11.0 Demonstrate an understanding of entrepreneurship.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Floor Covering Installation
Secondary Number: 8721400
Postsecondary Number: I460405

01.0 DEMONSTRATE SAFE AND EFFICIENT WORK PRACTICES--The student will be able to:

- 01.01 Identify commonly used tools and safety practices.
- 01.02 Demonstrate proper methods of lifting and carrying.
- 01.03 Explain safety rules to be followed at all times.

02.0 INTERPRET BLUEPRINTS AND SPECIFICATIONS--The student will be able to:

- 02.01 Identify commonly used symbols.
- 02.02 Determine area from dimensions given on prints.

03.0 SELECT, CARE FOR AND USE TOOLS AND MATERIALS--The student will be able to:

- 03.01 Demonstrate use of cutting and seaming tools.
- 03.02 Demonstrate use of carpet installation tools.
- 03.03 Demonstrate the proper method for installation floor covering with mastic.

04.0 DEMONSTRATE SKETCHING, MEASURING, AND DRAWING PROFICIENCY--The student will be able to:

- 04.01 Measure an area and complete floor covering requirements.
- 04.02 Perform an installation survey to develop sketches and notes for sequence of installation.

05.0 DEMONSTRATION KNOWLEDGE OF MATERIAL AND COST ESTIMATES--The student will be able to:

- 05.01 Solve material and cost estimating problems.
- 05.02 Maintain service, installation and time records.
- 05.03 Write a field report on apparent faulty product.

06.0 DEMONSTRATE KNOWLEDGE OF CURRENT INDUSTRY STANDARDS PRACTICES AND TECHNIQUES--The student will be able to:

- 06.01 Demonstrate understanding of carpet laying terminology.
- 06.02 Explain the importance of good customer relations.
- 06.03 Explain the new trends in the use of floor covering materials.

07.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 07.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 07.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 07.03 Read and follow written and oral instructions.
- 07.04 Answer and ask questions coherently and concisely.

07.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
07.06 Demonstrate appropriate telephone/communication skills.

08.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

08.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
08.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
08.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
08.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
08.05 Demonstrate an understanding of federal, state and local taxes and their computation.

09.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

09.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
09.02 Draw conclusions or make inferences from data.
09.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
09.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

10.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

10.01 Conduct a job search.
10.02 Secure information about a job.
10.03 Identify documents which may be required when applying for a job interview.
10.04 Complete a job application form correctly.
10.05 Demonstrate competence in job interview techniques.
10.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
10.07 Identify acceptable work habits.
10.08 Demonstrate knowledge of how to make job changes appropriately.
10.09 Demonstrate acceptable employee health habits.
10.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

11.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

11.01 Define entrepreneurship.
11.02 Describe the importance of entrepreneurship to the American economy.
11.03 List the advantages and disadvantages of business ownership.
11.04 Identify the risks involved in ownership of a business.
11.05 Identify the necessary personal characteristics of a successful entrepreneur.
11.06 Identify the business skills needed to operate a small business efficiently and effectively.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721410
Course Title: Floor Covering Installation 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the proper, safe use and care of hand and power tools related to floor covering trades. Installation of Mastic Applied floor covering is included.

01.0 DEMONSTRATE SAFE AND EFFICIENT WORK PRACTICES--The student will be able to:

- 01.01 Identify commonly used tools and safety practices.
- 01.02 Demonstrate proper methods of lifting and carrying.
- 01.03 Explain safety rules to be followed at all times.

03.0 SELECT, CARE FOR AND USE TOOLS AND MATERIALS--The student will be able to:

- 03.01 Demonstrate use of cutting and seaming tools.
- 03.02 Demonstrate use of carpet installation tools.
- 03.03 Demonstrate the proper method for installation floor covering with mastic.

07.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 07.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 07.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 07.03 Read and follow written and oral instructions.
- 07.04 Answer and ask questions coherently and concisely.
- 07.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 07.06 Demonstrate appropriate telephone/communication skills.

09.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 09.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 09.02 Draw conclusions or make inferences from data.
- 09.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 09.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721420
Course Title: Floor Covering Installation 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the identification of commonly used symbols and determining area from dimensions given on blueprints, carpet laying terminology, trends in floor covering and customer relations.

02.0 INTERPRET BLUEPRINTS AND SPECIFICATIONS--The student will be able to:

- 02.01 Identify commonly used symbols.
- 02.02 Determine area from dimensions given on prints.

06.0 DEMONSTRATE KNOWLEDGE OF CURRENT INDUSTRY STANDARDS PRACTICES AND TECHNIQUES--The student will be able to:

- 06.01 Demonstrate understanding of carpet laying terminology.
- 06.02 Explain the importance of good customer relations.
- 06.03 Explain the new trends in the used of floor covering materials.

08.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 08.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 08.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 08.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 08.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 08.05 Demonstrate an understanding of federal, state and local taxes and their computation.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721430
Course Title: Floor Covering Installation 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in material and cost estimates, develop job sketches and drawings, service, installation and time records.

04.0 DEMONSTRATE SKETCHING, MEASURING, AND DRAWING PROFICIENCY--The student will be able to:

- 04.01 Measure an area and complete floor covering requirements.
- 04.02 Perform an installation survey to develop sketches and notes for sequence of installation.

05.0 DEMONSTRATION KNOWLEDGE OF MATERIAL AND COST ESTIMATES--The student will be able to:

- 05.01 Solve material and cost estimating problems.
- 05.02 Maintain service, installation and time records.
- 05.03 Write a field report on apparent faulty product.

10.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 10.01 Conduct a job search.
- 10.02 Secure information about a job.
- 10.03 Identify documents which may be required when applying for a job interview.
- 10.04 Complete a job application form correctly.
- 10.05 Demonstrate competence in job interview techniques.
- 10.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
- 10.07 Identify acceptable work habits.
- 10.08 Demonstrate knowledge of how to make job changes appropriately.
- 10.09 Demonstrate acceptable employee health habits.
- 10.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

11.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 11.01 Define entrepreneurship.
- 11.02 Describe the importance of entrepreneurship to the American economy.
- 11.03 List the advantages and disadvantages of business ownership.
- 11.04 Identify the risks involved in ownership of a business.
- 11.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 11.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Gasoline Engine Service Technology
Occupational Area: Industrial Education

	Secondary	PSAV
Program Numbers	**8766000**	**I470606**
CIP Number	0647.060600	0647.060600
Grade Level	9-12, 30, 31	30,31
Length	6 credits	1,800 Hours
Certification	GASENG RPR @7 G	GASENG RPR @7 G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as small engine specialists (85328646), or gas engine repairers (625.281-026). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content will include the following: basic math skills; reading service manuals; use of microfiche and parts catalogs; use of hand tools, power tools and overhaul tools; servicing and reconditioning of engines; and troubleshooting and repairing of governors, speed controls, lubrication, ignition, fuel, power transfer, cooling exhaust and starting systems.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Gasoline Engine Service industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

Listed below are the courses that comprise this program when offered at the secondary level:

8766010 - Gasoline Engine Service Technology 1
8766020 - Gasoline Engine Service Technology 2
8766030 - Gasoline Engine Service Technology 3
8766040 - Gasoline Engine Service Technology 4
8766050 - Gasoline Engine Service Technology 5
8766060 - Gasoline Engine Service Technology 6

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

The outcomes and student performance standards which the handicapped student must master must be specified in each student's Individual Education Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 8.0, Language 8.0, Reading 8.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1800 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Apply safety rules and procedures.
02.0 Identify and properly use laboratory tools and equipment.
03.0 Demonstrate proficiency in applying customer service skills.
04.0 Demonstrate proficiency in repairing and maintaining basic two-stroke cycle engines.
05.0 Demonstrate proficiency in repairing and maintaining basic four-stroke cycle engines.
06.0 Diagnose and repair ignition systems.
07.0 Service fuel systems.
08.0 Service, repair and adjust engine controls.
09.0 Repair and service lubrication systems.
10.0 Service cooling and exhaust systems.
11.0 Diagnose, service, repair and adjust electrical systems.
12.0 Service and repair starting systems.
13.0 Demonstrate proficiency in repairing engine interior components.
14.0 Demonstrate proficiency in diagnosing and repairing power transfer systems.
15.0 Demonstrate appropriate communication skills.
16.0 Demonstrate appropriate math skills.
17.0 Demonstrate appropriate understanding of basic science.
18.0 Demonstrate employability skills.

19.0 Demonstrate an understanding of entrepreneurship.
20.0 Demonstrate Proficiency in applying technical recording and reporting skills.
21.0 Demonstrate proficiency in servicing, repairing and adjusting specific types of engins (elective options).

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Gasoline Engine Service Technology
Secondary Number: 8766000
Postsecondary Number: I470606

01.0 APPLY SAFETY RULES AND PROCEDURES--The student will be able to:

- 01.01 Practice shop safety rules and procedures.
- 01.02 Practice personal safety rules and procedures.
- 01.03 Practice fire safety rules and procedures.
- 01.04 Practice electrical safety rules and procedures.
- 01.05 Practice air tools safety rules and procedures.
- 01.06 Maintain a clean engine repair shop.

02.0 IDENTIFY AND PROPERLY USE LABORATORY TOOLS AND EQUIPMENT--The student will be able to:

- 02.01 Use general hand tools.
- 02.02 Use special hand tools.
- 02.03 Use precision measuring tools.
- 02.04 Use power tools.
- 02.05 Use fasteners.
- 02.06 Use gaskets and choose sealants.
- 02.07 Operate arc welding equipment.
- 02.08 Operate acetylene torches.

03.0 DEMONSTRATE PROFICIENCY IN APPLYING CUSTOMER SERVICE SKILLS--The student will be able to:

- 03.01 Prepare service orders properly.
- 03.02 Communicate solutions to customers.
- 03.03 Locate engine models and types.
- 03.04 Follow manufacturer's service manuals.
- 03.05 Locate parts in a parts catalog or on microfiche.
- 03.06 Complete service or work orders including any warranty information required by the manufacturer.
- 03.07 Listen to and interpret customer complaints to reduce repair time.
- 03.08 Apply two and four-cycle internal combustion theory or basic turbo-engine theory (as appropriate) to isolate problems.
- 03.09 Prepare cost estimates.

04.0 DEMONSTRATE PROFICIENCY IN REPAIRING AND MAINTAINING BASIC TWO-STROKE CYCLE ENGINES--The student will be able to:

- 04.01 Explain the basic principles of the operation of the two-stroke cycle internal combustion engine.
- 04.02 Identify types of engines.
- 04.03 Locate engine serial and model numbers.
- 04.04 Identify engine assemblies and systems.
- 04.05 Disassemble engines.
- 04.06 Remove, clean and inspect the head for cracks, warpage and damaged spark plug threads.
- 04.07 Remove, clean and inspect piston rods and assemblies.
- 04.08 Measure out-of-round piston and cylinder.
- 04.09 Check the total bearing surface of connecting rod bearings.

04.10 Measure piston skirts and ring grooves.
04.11 Measure the piston ring gap in the cylinder bore.
04.12 Install piston pins according to manufacturer's specifications.
04.13 Check rod and piston assembly alignment.
04.14 Install rings on pistons.
04.15 Install piston rod assemblies.
04.16 Check needle bearings.
04.17 Inspect crankshafts and install seals.
04.18 Inspect,clean and/or replace reed valves.
04.19 Reassemble engines.
04.20 Diagnose head problems by use of the visual inspection method.
04.21 Diagnose head problems by use of the compression tester method.
04.22 Diagnose head problems by use of the cylinder air pressure method.
04.23 Measure and check crankshafts with a micrometer to diagnose engine problems.

05.0 DEMONSTRATE PROFICIENCY IN REPAIRING AND MAINTAINING BASIC FOUR-STROKE CYCLE ENGINES--The student will be able to:

05.01 Explain the basic principles of the operation of the four-stroke cycle internal combustion engine.
05.02 Identify types of four-stroke cycle engines.
05.03 Locate engine serial and model numbers.
05.04 Identify engine assemblies and systems.
05.05 Disassemble engines.
05.06 Clean and inspect heads for cracks, warpage and damaged spark plug threads.
05.07 Inspect valves for warpage, burns, cracks, stem wear, tip wear and margin.
05.08 Grind valve seats and reface valves.
05.09 Check and inspect springs for free height, distortion and installed height.
05.10 Adjust valve lash.
05.11 Remove and inspect camshafts and lifters.
05.12 Measure camshafts.
05.13 Service camshaft bearings.
05.14 Clean and inspect lifters for wear.
05.15 Time valve drive assemblies.
05.16 Remove piston from rods assemblies.
05.17 Measure out-of-round and cylinder taper with a dial bore gage or micrometer.
05.18 Check piston pins and bosses for wear.
05.19 Measure piston ring lands width, out-of-round and taper.
05.20 Measure the piston ring gap in the cylinder bore.
05.21 Install and fit piston pins.
05.22 Check rod and piston assembly alignment.
05.23 Remove and replace rod bearings.
05.24 Hone and clean cylinders.
05.25 Install rings on pistons.
05.26 Measure and check crankshafts with a micrometer.
05.27 Check for end play.
05.28 Check the bearing bore with a telescoping gage using special tools provided by the engine manufacturer.
05.29 Reassemble engines.
05.30 Install oil seals.
05.31 Diagnose valve and head problems by use of the visual inspection method, i.e., water contamination vs. fuel-rich or lean carburetor adjustment.

05.32 Diagnose valve and head problems by use of the compression tester method.
05.33 Diagnose valve and head problems by use of the cylinder air pressure method.
05.34 Diagnose valve and head problems by use of the stethoscope method.

06.0 DIAGNOSE AND REPAIR IGNITION SYSTEMS-The student will be able to:

06.01 Identify and diagnose ignition systems and components.
06.02 Repair magneto ignition systems.
06.03 Repair solid-state ignition systems.
06.04 Repair battery ignition systems.
06.05 Repair impulse ignition systems.
06.06 Identify spark plugs and special applications.
06.07 Remove, adjust and replace spark plugs.
06.08 Adjust ignition system timing.
06.09 Diagnose magneto ignition systems.
06.10 Diagnose solid-state ignition systems.
06.11 Diagnose battery ignition systems.
06.12 Diagnose impulse ignition systems.

07.0 SERVICE FUEL SYSTEMS--The student will be able to:

07.01 Service air filters.
07.02 Service or replace fuel filters.
07.03 Service and repair suction-type carburetors.
07.04 Service and repair diaphragm-type carburetors.
07.05 Service and repair float-type carburetors.
07.06 Remove and service fuel supply systems.
07.07 Determine and use correct fuel and fuel mixtures.

08.0 SERVICE, REPAIR AND ADJUST ENGINE CONTROLS--The student will be able to:

08.01 Service, repair and adjust governor speed controls.
08.02 Service, repair and adjust remote speed controls.
08.03 Service, repair and adjust manual start-stop controls.
08.04 Service, repair and adjust electrical start-stop controls.
08.05 Service, repair and adjust zone systems.
08.06 Service, repair and adjust blade clutch controls.
08.07 Service, repair and adjust chain brake systems.
08.08 Comply with the Consumer Protection Act (CPA) for three-second stops.
08.09 Comply with the CPA for interlocks.
08.10 Comply with the CPA for blade tip speed.
08.11 Read and interpret CPA rules and regulations.

09.0 REPAIR AND SERVICE LUBRICATION SYSTEMS--The student will be able to:

09.01 Service crankcase breathers.
09.02 Replace seals and gaskets.
09.03 Identify oil grade terms.
09.04 Identify lubrication systems.
09.05 Identify, understand and relate types and ratios of two-cycle mix oils and their relationship to specific pieces of equipment.
09.06 Select proper oil grades/types.
09.07 Repair and serice lubrication systems.

10.0 SERVICE COOLING AND EXHAUST SYSTEMS--The student will be able to:

10.01 Service air cooling fins and screens.
10.02 Service two-cycle exhaust systems.
10.03 Service four-cycle exhaust systems.

11.0 DIAGNOSE, SERVICE, REPAIR AND ADJUST ELECTRICAL SYSTEMS--The student will be able to:

11.01 Operate electrical testing instruments.
11.02 Replace electrical system components.
11.03 Test and service batteries according to manufacturer's requirements and the use of the battery (i.e., motorcycle batteries require a trickle charge at 1.5 amps over a period of 8 hours).
11.04 Diagnose electrical system components.
11.05 Service, repair and adjust charging systems.

12.0 SERVICE AND REPAIR STARTING SYSTEMS--The student will be able to:

12.01 Service and repair manual starting systems.
12.02 Service and repair electrical starting systems.
12.03 Test and service battery starting systems.

13.0 DEMONSTRATE PROFICIENCY IN REPAIRING ENGINE INTERIOR COMPONENTS--The student will be able to:

13.01 Service, repair and adjust valve systems.
13.02 Service, repair and adjust rings, bores and pistons.
13.03 Service, repair and adjust crankshafts and bearings.
13.04 Service, repair and adjust rods.
13.05 Service, repair and adjust lubrication systems.
13.06 Service, repair and adjust internal governor.
13.07 Service, repair and adjust internal components timing.
13.08 Assemble complete engines to manufacturer's specifications.
13.09 Diagnose causes of component failures to determine if they are due to friction, resulting from poor lubrication or contaminated fuel or to normal wear.

14.0 DEMONSTRATE PROFICIENCY IN DIAGNOSING AND REPAIRING POWER TRANSFER SYSTEMS--The student will be able to:

14.01 Inspect and measure belts and chains.
14.02 Install belts and chains.
14.03 Repair manual transmissions.
14.04 Repair differentials.
14.05 Identify power transfer system components.
14.06 Replace drive components.
14.07 Remove and repair clutches.
14.08 Sharpen and balance blades.
14.09 Remove and replace or install blades correctly.
14.10 Remove and replace hydraulic pump systems.
14.11 Diagnose manual transmissions.
14.12 Diagnose differentials.
14.13 Diagnose drive components.

15.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

15.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
15.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
15.03 Read and follow written and oral instructions.
15.04 Answer and ask questions coherently and concisely.
15.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
15.06 Demonstrate appropriate telephone/communication skills.

16.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

16.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
16.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
16.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
16.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
16.05 Demonstrate an understanding of federal, state and local taxes and their computation.

17.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

17.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
17.02 Draw conclusions or make inferences from data.
17.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
17.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct a job search.
18.02 Secure information about a job.
18.03 Identify documents that may be required when applying for a job.
18.04 Complete a job application form correctly.
18.05 Demonstrate competence in job interview techniques
18.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
18.07 Identify acceptable work habits.
18.08 Demonstrate knowledge of how to make appropriate job changes.
18.09 Demonstrate acceptable employee health habits.
18.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

19.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

19.01 Define entrepreneurship.
19.02 Describe the importance of entrepreneurship to the American economy.
19.03 List the advantages and disadvantages of business ownership.
19.04 Identify the risks involved in ownership of a business.

19.05 Identify the necessary personal characteristics of a successful entrepreneur.
19.06 Identify the business skills needed to operate a small business efficiently and effectively.

The following intended outcomes are offered at the PSAV level only:

20.0 DEMONSTRATE PROFICIENCY IN APPLYING TECHNICAL RECORDING AND REPORTING SKILLS--The student will be able to:

20.01 Draw and interpret electrical, electronic, hydraulic and mechanical schematics.
20.02 Write reports.
20.03 Maintain test logs.
20.04 Make equipment failure reports.
20.05 Specify and requisition components.
20.06 Compose technical letters.
20.07 Write formal reports of laboratory experiences.

21.0 DEMONSTRATE PROFICIENCY IN SERVICING, REPAIRING AND ADJUSTING SPECIFIC TYPES OF ENGINES (ELECTIVE OPTIONS)--The student will be able to:

21.01 Service, repair and adjust lawn and garden equipment.
21.02 Service, repair and adjust commercial golf course equipment.
21.03 Service, repair and adjust commercial industrial equipment.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8766010
Course Title: Gasoline Engine Service Technology 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for performing laboratory skills to industry standards and applying customer service and basic mathematics skills.

01.0 APPLY SAFETY RULES AND PROCEDURES--The student will be able to:

- 01.01 Practice shop safety rules and procedures.
- 01.02 Practice personal safety rules and procedures.
- 01.03 Practice fire safety rules and procedures.
- 01.04 Practice electrical safety rules and procedures.
- 01.05 Practice air tools safety rules and procedures.
- 01.06 Maintain a clean engine repair shop.

02.0 IDENTIFY AND PROPERLY USE LABORATORY TOOLS AND EQUIPMENT--The student will be able to:

- 02.01 Use general hand tools.
- 02.02 Use special hand tools.
- 02.03 Use precision measuring tools.
- 02.04 Use power tools.
- 02.05 Use fasteners.
- 02.06 Use gaskets and choose sealants.
- 02.07 Operate arc welding equipment.
- 02.08 Operate acetylene torches.

03.0 DEMONSTRATE PROFICIENCY IN APPLYING CUSTOMER SERVICE SKILLS--The student will be able to:

- 03.01 Prepare service orders properly.
- 03.02 Communicate solutions to customers.
- 03.03 Locate engine models and types.
- 03.04 Follow manufacturer's service manuals.
- 03.05 Locate parts in a parts catalog or on microfiche.
- 03.06 Complete service or work orders including any warranty information required by the manufacturer.
- 03.07 Listen to and interpret customer complaints to reduce repair time.
- 03.08 Apply two and four-cycle internal combustion theory or basic turbo-engine theory (as appropriate) to isolate problems.
- 03.09 Prepare cost estimates.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8766020
Course Title: Gasoline Engine Service Technology 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for repairing and maintaining basic two-stroke and four-stroke cycle engines.

04.0 DEMONSTRATE PROFICIENCY IN REPAIRING AND MAINTAINING BASIC TWO-STROKE CYCLE ENGINES--The student will be able to:

- 04.01 Explain the basic principles of the operation of the two-stroke cycle internal combustion engine.
- 04.02 Identify types of engines.
- 04.03 Locate engine serial and model numbers.
- 04.04 Identify engine assemblies and systems.
- 04.05 Disassemble engines.
- 04.06 Remove, clean and inspect the head for cracks, warpage and damaged spark plug threads.
- 04.07 Remove, clean and inspect piston rods and assemblies.
- 04.08 Measure out-of-round piston and cylinder.
- 04.09 Check the total bearing surface of connecting rod bearings.
- 04.10 Measure piston skirts and ring grooves.
- 04.11 Measure the piston ring gap in the cylinder bore.
- 04.12 Install piston pins according to manufacturer's specifications.
- 04.13 Check rod and piston assembly alignment.
- 04.14 Install rings on pistons.
- 04.15 Install piston rod assemblies.
- 04.16 Check needle bearings.
- 04.17 Inspect crankshafts and install seals.
- 04.18 Inspect,clean and/or replace reed valves.
- 04.19 Reassemble engines.
- 04.20 Diagnose head problems by use of the visual inspection method.
- 04.21 Diagnose head problems by use of the compression tester method.
- 04.22 Diagnose head problems by use of the cylinder air pressure method.
- 04.23 Measure and check crankshafts with a micrometer to diagnose engine problems.

05.0 DEMONSTRATE PROFICIENCY IN REPAIRING AND MAINTAINING BASIC FOUR-STROKE CYCLE ENGINES--The student will be able to:

- 05.01 Explain the basic principles of the operation of the four-stroke cycle internal combustion engine.
- 05.02 Identify types of four-stroke cycle engines.
- 05.03 Locate engine serial and model numbers.
- 05.04 Identify engine assemblies and systems.
- 05.05 Disassemble engines.
- 05.06 Clean and inspect heads for cracks, warpage and damaged spark plug threads.
- 05.07 Inspect valves for warpage, burns, cracks, stem wear, tip wear and margin.
- 05.08 Grind valve seats and reface valves.

05.09 Check and inspect springs for free height, distortion and installed height.
05.10 Adjust valve lash.
05.11 Remove and inspect camshafts and lifters.
05.12 Measure camshafts.
05.13 Service camshaft bearings.
05.14 Clean and inspect lifters for wear.
05.15 Time valve drive assemblies.
05.16 Remove piston from rods assemblies.
05.17 Measure out-of-round and cylinder taper with a dial bore gage or micrometer.
05.18 Check piston pins and bosses for wear.
05.19 Measure piston ring lands width, out-of-round and taper.
05.20 Measure the piston ring gap in the cylinder bore.
05.21 Install and fit piston pins.
05.22 Check rod and piston assembly alignment.
05.23 Remove and replace rod bearings.
05.24 Hone and clean cylinders.
05.25 Install rings on pistons.
05.26 Measure and check crankshafts with a micrometer.
05.27 Check for end play.
05.28 Check the bearing bore with a telescoping gage using special tools provided by the engine manufacturer.
05.29 Reassemble engines.
05.30 Install oil seals.
05.31 Diagnose valve and head problems by use of the visual inspection method, i.e., water contamination vs. fuel-rich or lean carburetor adjustment.
05.32 Diagnose valve and head problems by use of the compression tester method.
05.33 Diagnose valve and head problems by use of the cylinder air pressure method.
05.34 Diagnose valve and head problems by use of the stethoscope method.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8766030
Course Title: Gasoline Engine Service 3 Technology
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for repairing and servicing ignition systems, fuel systems and engine controls.

06.0 DIAGNOSE AND REPAIR IGNITION SYSTEMS-The student will be able to:

06.01 Identify and diagnose ignition systems and components.
06.02 Repair magneto ignition systems.
06.03 Repair solid-state ignition systems.
06.04 Repair battery ignition systems.
06.05 Repair impulse ignition systems.
06.06 Identify spark plugs and special applications.
06.07 Remove, adjust and replace spark plugs.
06.08 Adjust ignition system timing.
06.09 Diagnose magneto ignition systems.
06.10 Diagnose solid-state ignition systems.
06.11 Diagnose battery ignition systems.
06.12 Diagnose impulse ignition systems.

07.0 SERVICE FUEL SYSTEMS--The student will be able to:

07.01 Service air filters.
07.02 Service or replace fuel filters.
07.03 Service and repair suction-type carburetors.
07.04 Service and repair diaphragm-type carburetors.
07.05 Service and repair float-type carburetors.
07.06 Remove and service fuel supply systems.
07.07 Determine and use correct fuel and fuel mixtures.

08.0 SERVICE, REPAIR AND ADJUST ENGINE CONTROLS--The student will be able to:

08.01 Service, repair and adjust governor speed controls.
08.02 Service, repair and adjust remote speed controls.
08.03 Service, repair and adjust manual start-stop controls.
08.04 Service, repair and adjust electrical start-stop controls.
08.05 Service, repair and adjust zone systems.
08.06 Service, repair and adjust blade clutch controls.
08.07 Service, repair and adjust chain brake systems.
08.08 Comply with the Consumer Protection Act (CPA) for three-second stops.
08.09 Comply with the CPA for interlocks.
08.10 Comply with the CPA for blade tip speed.
08.11 Read and interpret CPA rules and regulations.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8766040
Course Title: Gasoline Engine Service Technology 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for repairing and maintaining lubrication, cooling and exhaust systems.

09.0 REPAIR AND SERVICE LUBRICATION SYSTEMS--The student will be able to:

- 09.01 Service crankcase breathers.
- 09.02 Replace seals and gaskets.
- 09.03 Identify oil grade terms.
- 09.04 Identify lubrication systems.
- 09.05 Identify, understand and relate types and ratios of two-cycle mix oils and their relationship to specific pieces of equipment.
- 09.06 Select proper oil grades/types.
- 09.07 Repair and serice lubrication systems.

10.0 SERVICE COOLING AND EXHAUST SYSTEMS--The student will be able to:

- 10.01 Service air cooling fins and screens.
- 10.02 Service two-cycle exhaust systems.
- 10.03 Service four-cycle exhaust systems.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8766050
Course Title: Gasoline Engine Service Technology 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for repairing and servicing electrical systems, starting systems and engine interior components.

11.0 DIAGNOSE, SERVICE, REPAIR AND ADJUST ELECTRICAL SYSTEMS--The student will be able to:

- 11.01 Operate electrical testing instruments.
- 11.02 Replace electrical system components.
- 11.03 Test and service batteries according to manufacturer's requirements and the use of the battery (i.e., motorcycle batteries require a trickle charge at 1.5 amps over a period of 8 hours).
- 11.04 Diagnose electrical system components.
- 11.05 Service, repair and adjust charging systems.

12.0 SERVICE AND REPAIR STARTING SYSTEMS--The student will be able to:

- 12.01 Service and repair manual starting systems.
- 12.02 Service and repair electrical starting systems.
- 12.03 Test and service battery starting systems.

13.0 DEMONSTRATE PROFICIENCY IN REPAIRING ENGINE INTERIOR COMPONENTS--The student will be able to:

- 13.01 Service, repair and adjust valve systems.
- 13.02 Service, repair and adjust rings, bores and pistons.
- 13.03 Service, repair and adjust crankshafts and bearings.
- 13.04 Service, repair and adjust rods.
- 13.05 Service, repair and adjust lubrication systems.
- 13.06 Service, repair and adjust internal governor.
- 13.07 Service, repair and adjust internal components timing.
- 13.08 Assemble complete engines to manufacturer's specifications.
- 13.09 Diagnose causes of component failures to determine if they are due to friction, resulting from poor lubrication or contaminated fuel or to normal wear.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8766060
Course Title: Gasoline Engine Service Technology 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for repairing power transfer systems.

14.0 DEMONSTRATE PROFICIENCY IN DIAGNOSING AND REPAIRING POWER TRANSFER SYSTEMS--The student will be able to:

- 14.01 Inspect and measure belts and chains.
- 14.02 Install belts and chains.
- 14.03 Repair manual transmissions.
- 14.04 Repair differentials.
- 14.05 Identify power transfer system components.
- 14.06 Replace drive components.
- 14.07 Remove and repair clutches.
- 14.08 Sharpen and balance blades.
- 14.09 Remove and replace or install blades correctly.
- 14.10 Remove and replace hydraulic pump systems.
- 14.11 Diagnose manual transmissions.
- 14.12 Diagnose differentials.
- 14.13 Diagnose drive components.

15.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 15.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 15.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 15.03 Read and follow written and oral instructions.
- 15.04 Answer and ask questions coherently and concisely.
- 15.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 15.06 Demonstrate appropriate telephone/communication skills.

16.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 16.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 16.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 16.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 16.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 16.05 Demonstrate an understanding of federal, state and local taxes and their computation.

17.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

17.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
17.02 Draw conclusions or make inferences from data.
17.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
17.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct a job search.
18.02 Secure information about a job.
18.03 Identify documents that may be required when applying for a job.
18.04 Complete a job application form correctly.
18.05 Demonstrate competence in job interview techniques
18.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
18.07 Identify acceptable work habits.
18.08 Demonstrate knowledge of how to make appropriate job changes.
18.09 Demonstrate acceptable employee health habits.
18.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

19.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

19.01 Define entrepreneurship.
19.02 Describe the importance of entrepreneurship to the American economy.
19.03 List the advantages and disadvantages of business ownership.
19.04 Identify the risks involved in ownership of a business.
19.05 Identify the necessary personal characteristics of a successful entrepreneur.
19.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Glazing
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I460406**
CIP Number	0646.040600
Grade Level	30, 31
Length	450 hours
Certification	TEC CONSTR ¶7 ¶G
	GLAZIER @7 G
	BLDG CONST ¶7 ¶G

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as glaziers (87811559), or to provide supplemental training for persons previously or currently employed in this occupation.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and installation and repair of all types of glass, plastic, and acrylic windows, walls, and panels.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Glazing industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program and provide instruction in safe use of tools, equipment and materials, cutting and installation of glass, acrylics and plastics, and installation of doors, windows and hardware.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 7.0, Language 7.0, Reading 8.0. This grade level number corresponds to a grade equivalent score obtained on a state-designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 450 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Perform mathematical calculations and estimate quantities of materials.
02.0 Read and interpret blueprints.
03.0 Cut and install glass, acrylics and plastics.
04.0 Identify, select and use glazing and caulking compounds.
05.0 Install doors, windows and hardware.
06.0 Replace broken or defective panels.
07.0 Demonstrate appropriate communication skills.
08.0 Demonstrate appropriate understanding of basic science.
09.0 Demonstrate employability skills.
10.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Glazing
Secondary Number:
Postsecondary Number: I460406

01.0 PERFORM MATHEMATICAL CALCULATIONS AND ESTIMATE QUANTITIES OF MATERIALS--The student will be able to:

- 01.01 Measure frames with ruler to determine size of panes needed.
- 01.02 Use measurement instruments and tools to determine dimensions.
- 01.03 Develop material utilization and cost estimate for jobs.

02.0 READ AND INTERPRET BLUEPRINTS--The student will be able to:

- 02.01 Differentiate between various types of glass.
- 02.02 Identify parts of a building component using a blueprint.
- 02.03 Recognize commonly used symbols on blueprints and schematics.
- 02.04 Interpret blueprints and schematics.
- 02.05 Perform job set up.
- 02.06 Lay out cutting lines on glass following specifications, and cut glass to shape.
- 02.07 Mark outline or pattern on glass.

03.0 CUT AND INSTALL GLASS, ACRYLICS AND PLASTICS--The student will be able to:

- 03.01 Store, handle and transport glass and materials safely.
- 03.02 Polish glass.
- 03.03 Tint glass.
- 03.04 Spray glass with tinting solution.
- 03.05 Coat glass.
- 03.06 Cut and install laminated safety glass in windows and windshields.
- 03.07 Install mirrors or structural glass using mastic, screws, or decorating molding.
- 03.08 Install glass in windows, skylights, store fronts, display cases, or on surfaces.
- 03.09 Apply edging to glass.
- 03.10 Grind and bevel edges of glass.
- 03.11 Scribe and cut glass with straight edge of glass cutter to specifications.
- 03.12 Break off excess glass by hand and notched tool.
- 03.13 Cut glass to fit window dimension.
- 03.14 Cut glass following pattern, using glasscutters.
- 03.15 Select and use proper tools and equipment for job.

04.0 IDENTIFY, SELECT AND USE GLAZING AND CAULKING COMPOUNDS--The student will be able to:

- 04.01 Install solar heat collector glass units.
- 04.02 Install glass and insert glazing points and wire clips using putty knife or spring machine.
- 04.03 Prepare putty for wood sash use.
- 04.04 Select proper type of materials.
- 04.05 Prepare putty for steel sash use.

04.06 Apply sealants and gasket materials as prescribed by manufacturers.
04.07 Spread and smooth putty around edges of panes with putty knife to seal joints.

05.0 INSTALL DOORS, WINDOWS AND HARDWARE--The student will be able to:

05.01 Install or replace screen and hardware wire.
05.02 Replace screen or metal screen frame.
05.03 Replace screen on wood screen frame.
05.04 Install or replace a window and casing in accordance with manufacturers specifications.
05.05 Select, measure, and cut metal or plastic moldings and members to required length in accordance with manufacturers specifications.
05.06 Install or replace a prehung door and casing in accordance with manufacturers specifications.
05.07 Install or replace door and/or window hardware in accordance with manufacturers specifications.
05.08 Drill holes in glass and mirrors.
05.09 Install airtight plate glass windows in refrigeration display cases and walk in coolers.
05.10 Install glass in doors or other openings in metal furniture using handtools and power tools.
05.11 Secure glass by fastening metal and insulating strips around edges in accordance with manufacturers specifications.
05.12 Assemble and install metal framed glass enclosures for showers.
05.13 Install or replace stained glass windows in accordance with manufacturers specifications.
05.14 Install or replace metal window and door frames into which glass panels are to be fitted in accordance with manufacturers specifications.
05.15 Set glass doors into frame and fit hinges in accordance with manufacturers specifications.
05.16 Fasten hardware to glass doors in accordance with manufacturers specifications.
05.17 Fasten glass panes into wood sash with glaziers points.
05.18 Assemble platform and staging materials for high work.
05.19 Fasten and use safety lines and equipment.
05.20 Attach and use respirator when working with toxic materials.
05.21 Comply with safety regulations and procedures.

06.0 REPLACE BROKEN OR DEFECTIVE PANELS--The student will be able to:

06.01 Inspect glass for flaws, chips, scratches, or rough spots.
06.02 Remove old putty.
06.03 Remove broken glass with chisel, hacking knife or power tools.
06.04 Remove and replace glass in metal frame window.
06.05 Remove and replace glass in wood frame window.
06.06 Install or replace tempered plastic.
06.07 Install or replace thermopane.
06.08 Remove and replace old or damaged glass.
06.09 Remove hardware and glass retainers.
06.10 Install or replace plate, safety, or wire glass.

07.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

07.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
07.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
07.03 Read and follow written and oral instructions.
07.04 Answer and ask questions coherently and concisely.
07.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
07.06 Demonstrate appropriate telephone/communication skills.

08.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

08.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
08.02 Draw conclusions or make inferences from data.
08.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
08.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

09.01 Conduct a job search.
09.02 Secure information about a job.
09.03 Identify documents which may be required when applying for a job interview.
09.04 Complete a job application form correctly.
09.05 Demonstrate competence in job interview techniques.
09.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
09.07 Identify acceptable work habits.
09.08 Demonstrate knowledge of how to make job changes appropriately.
09.09 Demonstrate acceptable employee health habits.
09.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

10.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

10.01 Define entrepreneurship.
10.02 Describe the importance of entrepreneurship to the American economy.
10.03 List the advantages and disadvantages of business ownership.
10.04 Identify the risks involved in ownership of a business.
10.05 Identify the necessary personal characteristics of a successful entrepreneur.
10.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Graphic Arts Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0650.040201
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as printing operations managers. This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content will include the following: pre-press, press and post-press operations, administration, copy preparation, stripping black and white, line graphic photo processes, offset presswork, estimating, graphic arts halftone processes and color reproduction technology. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Graphic Arts industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: customer layouts, composition and camera ready copy; producing line negatives, halftone negatives and contacts; stripping line negatives, halftone negatives, and multicolor and process color; producing printing plates, single color proofs and color proofs; operating and adjusting duplicators; and operating cutting, folding and binding equipment.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Perform reproduction process operations.
02.0 Perform estimating operations.
03.0 Perform graphic design operations.
04.0 Perform typographical operations.
05.0 Perform copy preparation operations.
06.0 Perform line graphic photo operations.
07.0 Perform graphic arts halftone operations.
08.0 Perform color reproduction operations.
09.0 Perform stripping operations.
10.0 Perform proofing and plate-making operations.
11.0 Perform offset operations.
12.0 Perform finishing operations.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate appropriate math skills.
15.0 Demonstrate appropriate understanding of basic science.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Graphic Arts Technology
Secondary Number:
Postsecondary Number: 0650.040201

01.0 PERFORM REPRODUCTION PROCESS OPERATIONS--The student will be able to:

01.01 Identify the equipment and materials used in reproduction process operations, their parts and functions and the safety rules relating to their operation.
01.02 Set up and operate reproduction tools and equipment.
01.03 Perform operator maintenance on reproduction equipment.
01.04 Identify and explain the scope, purpose, size and products of the graphic communications industry by identifying various statistics that relate to its existence.
01.05 Trace the evolution of writing, kinds of communications, materials used and printing by identifying and recalling times, cultures and specific inventions.
01.06 Analyze the various reproduction processing such as: letterpress, gravure, offset lithography, screen, flexography and electronic.
01.07 Compare and contrast the various reproduction of elements in each reproduction process to distinguish the strengths and weaknesses of each.
01.08 Explain the value of planning and design to the graphic communication process by identifying principles of design and the steps used in the planning of layouts.
01.09 Analyze the various printing surfaces by contrast and comparison to a variety of elements in each process to distinguish the difference in each surface.
01.10 Evaluate printing processes by judging advantages and disadvantages of each.
01.11 Define terms used in mark-up of copy for composition by being able to recognize marks, instructions and other data.
01.12 Place in sequential order the production steps of a printing job from conception to completion.
01.13 Define terms used in making a paste-up or mechanical.
01.14 Define and explain the elements of typography and their value to the printing and design process.
01.15 Analyze typographic terms.
01.16 Analyze the current systems of composition by comparison and contrast and by being able to categorize and distinguish each.
01.17 Define and explain the terms and methodology used in commercial and process photography as they relate to the printing processes.
01.18 Analyze plates used in the various printing processes.
01.19 Define and explain the principles and generalizations in the use of color in design of printing.
01.20 Define and explain the history of inks, substrates and differences between printing processes.
01.21 Define and explain the history of paper and basic components in paper by recalling items used in place of paper and identifying the steps used in the manufacture of paper.
01.22 List and explain career opportunities in printing.
01.23 Analyze the difference between artist use and production use of printing.

01.24 Set up and operate machine used in reproduction process operation in accordance with manufacturer's specifications.

01.25 Perform operator maintenance on machine used in reproduction process operation in accordance with manufacturer's specifications.

02.0 PERFORMING ESTIMATING OPERATIONS--The student will be able to:

02.01 Identify the equipment and materials used in estimating operations, their parts and functions and the safety rules relating to their operation.

02.02 Define and explain the methods of reproduction illustrated by offset and letter press.

02.03 Define and explain the organization and management of a wall organized printing company by identifying its organizational elements.

02.04 Define and explain an estimator's duties including the knowledge of categories of production pertaining to estimating.

02.05 Define and explain the role and responsibility of the estimator in a printing plant.

02.06 Define and explain the sources of information available to the estimator.

02.07 Define and explain the factors that must be considered by the estimator in preparing an estimate such as standard production times, budgeted hour cost rates, outside purchased services and material costs.

02.08 Analyze terms used in estimating.

02.09 Place in sequential order the progressive steps for preparing an estimate.

02.10 Define and explain the principle characteristics of the different papers used in the printing process.

02.11 List the job tasks that usually appear on an estimating form.

02.12 List the job tasks that usually appear on an estimating form in the sequential order in which they are usually performed.

02.13 Apply formula for computing weight of paper stock.

02.14 Define and explain basic sheet sizes by listing the paper categories with the basic sheet size for each.

02.15 Prepare costs estimates utilizing given items, costs and specifications for a one-color, one-up job.

02.16 Prepare costs estimates utilizing given items, costs and specifications for a one-color, multiple.

02.17 Prepare cost estimates utilizing given items, costs and specifications for a one-color, step job.

02.18 Prepare cost estimates utilizing given items, costs and specifications for a one-color, four-page job.

02.19 Prepare cost estimates utilizing given items, costs and specifications for a one-color, eight-page job.

02.20 Prepare cost estimates utilizing given items, costs and specifications for a one color, sixteen-page folded, saddle stitched job.

03.0 PERFORM GRAPHIC DESIGN OPERATIONS--The student will be able to:

03.01 Identify the equipment and materials used in graphic design operations, their parts and functions and the safety rules relating to their operation.

03.02 Set up and operate graphic design operation tools and equipment.

03.03 Perform operator maintenance on graphic design operation equipment.

03.04 Prepare thumbnail layout.
03.05 Prepare rough layout.
03.06 Prepare comprehensive layout including finish working dummy.
03.07 Size and proportion photographs, line drawings and other copy elements.
03.08 Copyfit and mark up (specify type sizes and styles).

04.0 PERFORM TYPOGRAPHICAL OPERATIONS--The student will be able to:

04.01 Identify the equipment and materials used in typographical operations, their parts and functions and the safety rules relating to their operation.
04.02 Set up and operate typographical tools and equipment.
04.03 Perform operator maintenance on typographical equipment.
04.04 Define and explain typographic terms for measurement.
04.05 Set up and proofread type by a variety of means.
04.06 Analyze and solve printing measurement problems using a group of specific facts, a system of logic and arithmetic based on printer's measurements.
04.07 Set up and operate a variety of typesetting machines.
04.08 Evaluate printed typed samples for visual spacing to mechanical spacing and certain letter combinations to other letter combinations and produce examples.
04.09 Define terms used in typesetting and typography and explain the difference.
04.10 Define and explain terms that deal with type identification.
04.11 Define and explain the elements of typography and their values in printing and design.
04.12 Solve copyfitting problems by applying typographic principles.
04.13 Evaluate typesetting systems by judging their advantages and their disadvantages.
04.14 Apply the principles of several copyfitting systems for counting manuscripts by predicting keystrokes in each system.
04.15 Perform manual, automatic and semi-automatic justification decisions.

05.0 PERFORM COPY PREPARATION OPERATIONS--The student will be able to:

05.01 Identify the equipment and materials used in copy preparation operations, their parts and functions and the safety rules relating to their operation.
05.02 Set up and operate copy preparation tools and equipment.
05.03 Perform operator maintenance on copy preparation equipment.
05.04 Define and explain the scope and purpose of copy preparation.
05.05 Define and explain terms used in copy preparation.
05.06 Define and explain career opportunities preparation.
05.07 Apply the principles of mechanical paste-up using printed type proofs.
05.08 Define, explain and demonstrate how to scale by diagonal line method.
05.09 Define, explain and demonstrate the use of the proportion wheel.
05.10 Apply the use of the proportion wheel to various copy situations.
05.11 Define, explain and demonstrate layout for mechanicals.
05.12 Define and explain the different types of light sensitive materials used on copy preparation.
05.13 Define, explain and apply the elements of mechanical masking.
05.14 Explain and demonstrate the use of a process color chart such as a Murphy color wheel when specifying color breaks.

05.15 Demonstrate the use of amberlith by cutting to the specific areas where color is to be masked in basic art drawings.
05.16 Demonstrate application of room light film materials.
05.17 Paste up mechanical elements including keyline for photographs and tint blocks; and ruling.
05.18 Prepare tissue overlay and specify color break, tint percentages, and reverses.
05.19 Check and compare completed mechanical to comprehensive layout for final proofing.

06.0 PERFORM LINE GRAPHIC PHOTO OPERATIONS--The student will be able to:

06.01 Identify the equipment and materials used in line graphic photo operations, their parts and functions and the safety rules relating to their operations.
06.02 Set up and operate line graphic photo tools and equipment.
06.03 Perform operator maintenance on line graphic photo equipment.
06.04 Analyze and solve lithographic scaling problems by analyzing facts, calculating proper sizes or percentages and stating solutions in appropriate terms.
06.05 Define and explain the photographic record.
06.06 Define and explain terms relating to film construction.
06.07 Define and explain characteristics of film relating to speed, contrast and color.
06.08 Define and explain terms relating to line photography.
06.09 Define and explain terms relating to electromagnetic energy and spectrum.
06.10 Demonstrate the application and alignment of camera planes and working parts.
06.11 Operate a process camera by making various adjustments and by making a series of negatives to produce appropriate results using a variety of photographic materials.
06.12 Demonstrate the application and limitation of the relationship between time, F-stop, exposure and light intensity by using a reflection density guide and interpreting results.
06.13 Define and explain specific terms in relation to a process camera lens.
06.14 Define and explain lens aberrations and flare.
06.15 Define and explain the law of inverse squares, law of reflection, and law of reflection of light.
06.16 Demonstrate application and limitation of the relationship between bellows extension, exposure and F-stops by using formulas, charts, diaphragm control systems and interpret results.
06.17 Demonstrate the mixing of photographic chemicals for processing of photographic materials by identifying rations, recognizing terms and different chemical and mixing them when necessary.
06.18 Operate a vacuum frame and use a variety of films, copy and procedures.
06.19 Demonstrate application and procedures to produce film negatives and positives with a variety of films, equipment and conditions.
06.20 Demonstrate the use of a reflection density guide by establishing a standard under a given set of conditions for prediction, control and standardization of results.
06.21 Demonstrate the use of a density guide and the arithmetic behind it by identifying step relationships, explaining exposure changes to steps, by being able to explain changes in density and by confirming them in laboratory practice.

06.22 Define and explain terms relating to photographic filters used in process photography.
06.23 Demonstrate the use of filters in laboratory projects.
06.24 Define and explain the need and value of establishing and maintaining standardized procedures.

07.0 PERFORM GRAPHIC ARTS HALFTONE OPERATIONS--The student will be able to:

07.01 Identify the equipment and materials used in graphic arts halftone operations, their parts and functions and the safety rules relating to their operation.
07.02 Set up and operate graphic arts halftone tools and equipment.
07.03 Perform operator maintenance on graphic arts halftone equipment.
07.04 Define halftone terminology.
07.05 Calibrate a reflection densitometer to manufacturer's specifications.
07.06 Compare and contrast the funding of the reflection densitometer with the Kodak Density Guide.
07.07 Solve a variety of exposure problems using an exposure computer.
07.08 Solve a variety of exposure problems using neutral density filters.
07.09 Demonstrate and explain a variety of special films such as litho pan, rapid access and room light.
07.10 Evaluate a typical printed halftone under normal laboratory conditions and determine the best possible exposure combination to help establish laboratory standards halftone photography.
07.11 Develop sets of directions for the major basics of halftone photography, basic exposure, basic density range of the contact screen, basic density of the copy, basic flash and basic material on which to print on.
07.12 Solve a variety of problems by applying the principles of densitometry and exposure.

08.0 PERFORM COLOR REPRODUCTION OPERATIONS--The student will be able to:

08.01 Identify the equipment and materials used in color reproduction operations, their parts and functions and the safety rules relating to their operation.
08.02 Set up and operate color reproduction tools and equipment.
08.03 Perform operator maintenance on color reproduction equipment.
08.04 Apply the principles of visible light by constructing a spectrograph and placing the major subdivisions of white light in their proper position according to scientific theory.
08.05 Define and explain the interrelationship of light and color.
08.06 Define and explain the principles of color theory as they apply to process printing.
08.07 Define and explain the difference between additive and subtractive color.
08.08 Define and explain the color absorption/reflection theory as it applies to process color filters and printing inks.
08.09 Compare and contrast color separation systems for direct, indirect and electronic scanning.
08.10 Interpret manufacturer's film data sheets of various applicable films.
08.11 Define and explain densitometry and sensitometry.
08.12 Apply the principles of densitometry and sensitometry to establish local laboratory standards.

08.13 Define and explain the requirements for photographic color separation by listing the materials, equipment, facilities and special considerations required in the process.

08.14 Define and explain the requirements for color production by graphing and interpreting the deficiencies of printing inks.

09.0 PERFORM STRIPPING OPERATIONS--The student will be able to:

09.01 Identify the equipment and materials used in stripping operations, their parts and functions and the safety rules relating to their operation.

09.02 Set up and operate stripping operations tools and equipment.

09.03 Perform operator maintenance on stripping operations equipment.

09.04 Define and explain terms used in stripping.

09.05 Define and explain stripping as a career opportunity.

09.06 Analyze the various approaches to stripping by comparing and contrasting pre-printed masking sheets with conventional non-printed masking sheets.

09.07 Identify the parts of a contact frame and point light source and explain their use.

09.08 Produce contacts using orthochromatic and duplicating film using transmission density guide and standard time and temperature development.

09.09 Identify equipment and materials used in the stripping function and the safety rules pertaining to each.

09.10 Apply basic principles of stripping using: T-square and triangle to align, position and tape film.

09.11 Prepare working dummy and produce a one-color, one-up layout.

09.12 Prepare working dummy and produce a one-color, multiple layout.

09.13 Define and explain methodology relating to step-and-repeat by choosing or recognizing the different procedures relating to particular situations.

09.14 Prepare working dummy and produce a one-color, step layout.

09.15 Prepare working dummy and produce a one-color, four-page layout.

09.16 Prepare working dummy and produce a one-color, eight-page layout.

09.17 Demonstrate the cutting of rubylith masks by trapping to key line negatives.

09.18 Prepare a working dummy and apply principles of a pin-register system to produce a multiple-burn exposure layout (halftone and screen tints).

09.19 Prepare a working dummy and apply principles of a pin-register system to produce and strip a multi-flat color layout.

09.20 Produce composed film from multi-flat color layout and strip in position.

09.21 Inspect and evaluate flats to original mechanical.

10.0 PERFORM PROOFING & PLATEMAKING OPERATIONS--The student will be able to:

10.01 Identify the equipment and materials used in proofing and platemaking operations, their parts and functions and the safety rules relating to their operation.

10.02 Set up and operate proofing and platemaking tools and equipment.

10.03 Perform operator maintenance on proofing and platemaking equipment.

10.04 Identify equipment and materials used in proofing and platemaking to obtain proper exposures using a transmission density guide.

10.05 Produce proofs on diazo, silver and color proofing materials.
10.06 Inspect and evaluate proofs to original mechanical.
10.07 Identify, contrast and compare image carriers such as paper, photo direct, foil, aluminum additive and aluminum subtractive for run length and quality to suit customer specifications.
10.08 Process paper, photo direct, foil, aluminum additive and aluminum subtractive image carriers to manufacturer specifications.
10.09 Inspect and evaluate plates to proofs.
10.10 File, handle and retrieve flats and plates.

11.0 PERFORM OFFSET OPERATIONS--The student will be able to:

11.01 Identify the equipment and materials used in offset presswork operations, their parts and functions and the safety rules, rules relating to their operation.
11.02 Set up and operate offset presswork tools and equipment.
11.03 Perform operator maintenance on offset presswork equipment.
11.04 Define and explain the basic principle of the lithographic process.
11.05 Compare and contrast a single-sheet feeder, stream-fed, web-fed systems.
11.06 Compare and contrast deliver systems for sheet- and web-fed systems.
11.07 Compare and contrast register systems such as side-guide, pull-guide and head register.
11.08 Compare and contrast ink and moisture system for sheet- and web-fed systems.
11.09 Explain make ready procedures in proper sequence in preparation for actual production.
11.10 Apply basic principles of offset lithography pertaining to dampening systems (ducted and continuous).
11.11 Apply basic principles of offset lithography pertaining to fountain solutions chemical components (acid, alkaline and neutral).
11.12 Apply basic principles of offset lithography pertaining to pH control and its effects on the lithographic process.
11.13 Apply basic principles of offset lithography pertaining to interrelationships of paper.
11.14 Demonstrate the inking system by identifying each part and making proper adjustments.
11.15 Make ready and demonstrate feeder and delivery systems.
11.16 Demonstrate methods for achieving register by making machine adjustments.
11.17 Apply basic principles of offset press operations to produce work and turn, work and tumble and sheetwise printed products.

12.0 PERFORM FINISHING OPERATIONS--The student will be able to:

12.01 Identify the equipment and materials used in finishing/binding operation, their parts and functions and the safety rules relating to their operation.
12.02 Identify basic principles of finishing/binding operations pertaining to pre-press paper cutting, post press paper cutting and post bindery cutting (after folding, stitching, etc.).
12.03 Apply basic principles of finishing/binding operations pertaining to sheet cutting.
12.04 Identify basic principles of finishing/binding operations pertaining to grain, caliper and finish (coated or uncoated or paper).

12.05 Identify basic principles of finishing/binding operations pertaining to signature configurations for sheet and web presses.
12.06 Apply basic principles of finishing/binding operations pertaining to folding.
12.07 Apply basic principles of finishing/binding operations pertaining to scoring and perforating.
12.08 Identify basic principles of finishing/binding operations pertaining to collating and gathering.
12.09 Identify basic principles of finishing/binding operations pertaining to binding alternatives (saddle, side, perfect, comb, spiral, case, etc.).
12.10 Identify basic principles of finishing/binding operations pertaining to adhesive binding (padding and fan-apart).

13.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

13.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
13.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
13.03 Read and follow written and oral instructions.
13.04 Answer and ask questions coherently and concisely.
13.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
13.06 Demonstrate appropriate telephone/communication skills.

14.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

14.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
14.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
14.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
14.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
14.05 Demonstrate an understanding of federal, state and local taxes and their computation.

15.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

15.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
15.02 Draw conclusions or make inferences from data.
15.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
15.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

16.0 PERFORM EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Identify documents that may be required when applying for a job.

16.04 Complete a job application form correctly.
16.05 Demonstrate competence in job interview techniques.
16.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
16.07 Identify acceptable work habits.
16.08 Demonstrate knowledge of how to make job changes.
16.09 Demonstrate acceptable employee health habits.
16.10 Interview job applicants.
16.11 Develop and monitor safe and efficient work practices.
16.12 Stimulate, motivate and direct the development of others.
16.13 Interact affectively with customers and vendors.
16.14 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define entrepreneurship.
17.02 Describe the importance of entrepreneurship to the American economy.
17.03 List the advantages and disadvantages of business ownership.
17.04 Identify the risks involved in ownership of a business.
17.05 Identify the necessary personal characteristics of a successful entrepreneur.
17.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Graphic Design Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0650.040200
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT**: The purpose of this program is to prepare students for employment as artist and related workers (34035176), graphic designers (141.061-018) or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, illustration, style/technique medium, concept formulation, design, drawing, lettering, display/exhibit design, layout, paste-up and mechanical preparation, printing processes, air-brush techniques, use of industry tools and equipment, use and care of materials, use of current industry standards/ practices/techniques, typography, photographic procedures, color theorem, marketing/advertising theorem, outdoor advertising, T.V. graphics, computer-aided layout, and portfolio development.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Graphic Design industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program and provide instruction in illustration, concept formulation, design, drawing, lettering, display/exhibit design, layout, paste-up and mechanical preparation, air-brush techniques, use of tools and equipment, use of materials, use of techniques/ practices/standards, typography, photographic procedures, color application, outdoor advertising design, T.V. graphics, computer aided layout, and portfolio development.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has

chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate effective communication skills.
02.0 Demonstrate leadership skills.
03.0 Demonstrate safe and efficient work practices.
04.0 Perform illustrations.
05.0 Demonstrate style/techniques.
06.0 Demonstrate mediums.
07.0 Formulate concepts/theory.
08.0 Apply design theories.
09.0 Demonstrate drawing techniques.
10.0 Letter effectively.
11.0 Create exhibit/display designs.
12.0 Create advertising layouts.
13.0 Perform paste-ups.
14.0 Printing processes.
15.0 Interpret printing process.
16.0 Create airbrush illustrations.
17.0 Demonstrate proper use of industry tools and equipment.
18.0 Demonstrate proper use and care of industry materials.
19.0 Demonstrate knowledge of current industry standards, practices, techniques.
20.0 Demonstrate creative use of typography.
21.0 Create outdoor advertising design.
22.0 Interpret photographic procedures.
23.0 Apply marketing/advertising theories.
24.0 Apply color theories.
25.0 Develop industry-level portfolios.
26.0 Design television graphics.
27.0 Create computer-aided layouts.
28.0 Demonstrate appropriate math skills.
29.0 Demonstrate appropriate understanding of basic science.
30.0 Demonstrate employability skills.
31.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Graphic Design Technology
Secondary Number:
Postsecondary Number: 0650.040200

01.0 DEMONSTRATE EFFECTIVE COMMUNICATION SKILLS--The student will be able to:

- 01.01 Demonstrate presentation skills.
- 01.02 Prepare written correspondence.
- 01.03 Demonstrate good telephone technique.
- 01.04 Read and interpret written and oral instructions.

02.0 DEMONSTRATE LEADERSHIP SKILLS--The student will be able to:

- 02.01 Demonstrate management abilities.
- 02.02 Demonstrate leadership qualities.

03.0 DEMONSTRATE SAFE AND EFFICIENT WORK PRACTICES--The student will be able to:

- 03.01 Follow industry rules, safety regulations and policies.
- 03.02 Demonstrate proper use of toxic materials.

04.0 PERFORM ILLUSTRATION--The student will be able to:

- 04.01 Create line art.
- 04.02 Demonstrate hard and soft line illustrations.
- 04.03 Demonstrate transparent and opaque techniques.
- 04.04 Create cartoons, caricatures, and animations.
- 04.05 Create fashion illustration.
- 04.06 Develop illustration skills and techniques.
- 04.07 Apply screen tints and color films for illustrations.

05.0 DEMONSTRATE STYLE TECHNIQUES--The student will be able to:

- 05.01 Select appropriate style or technique to problem solving.
- 05.02 Display creative talent and ingenuity.

06.0 DEMONSTRATE MEDIUMS--The student will be able to:

- 06.01 Apply/use a variety of artistic media.

07.0 FORMULATE CONCEPT/THEORY--The student will be able to:

- 07.01 Apply principles of design.
- 07.02 Demonstrate the design process.

08.0 APPLY DESIGN THEORIES--The student will be able to:

- 08.01 Create a design in black and white or color.
- 08.02 Create various mockups and dummies.
- 08.03 Produce quality comprehensive layouts in a variety of formats.

09.0 DEMONSTRATE DRAWING TECHNIQUES--The student will be able to:

- 09.01 Draw three dimensional shapes.

09.02 Draw still life.
09.03 Draw figures.
09.04 Demonstrate use of perspective.

10.0 LETTER EFFECTIVELY--The student will be able to:

10.01 Choose appropriate letter styles.
10.02 Utilize pen, brush, marker, and pencil lettering.
10.03 Demonstrate correct spacing of letters.
10.04 Demonstrate creative calligraphic lettering.

11.0 CREATE EXHIBIT/DISPLAY DESIGNS--The student will be able to:

11.01 Apply 2D or 3D design principles.
11.02 Construct scale models.
11.03 Indicate proper specifications for design.
11.04 Coordinate production of displays and exhibits.

12.0 CREATE ADVERTISING LAYOUTS--The student will be able to:

12.01 Produce comprehensive layouts for advertising in newspaper, advertising, magazines, billboards, and a advertising campaign.
12.02 Identify advertising needs and develop appropriate solution.

13.0 PERFORM PASTE-UPS--The student will be able to:

13.01 Demonstrate paste-up techniques.
13.02 Perform cropping of photograph and sizing of illustrations.
13.03 Prepare mechanicals "one-color, two-color, three-color, four-color" separations.
13.04 Prepare amberlith overlays.
13.05 Demonstrate techniques for knockouts and dropouts.
13.06 Demonstrate proper registration of color and overlays.
13.07 Demonstrate proper clean-up opaquing procedures.

14.0 PRINTING PROCESSES--The student will be able to:

14.01 Analyze and identify method of proofing.
14.02 Determine methods of printing.
14.03 Select stocks and inks.
14.04 Explain color separation process.
14.05 Identify and specify half-tone and line negatives.
14.06 Interpret stripping procedures.
14.07 Identify specialty printing methods.

15.0 INTERPRET PRINTING PROCESS--The student will be able to:

15.01 Identify special printing methods.
15.02 Explain basic print process.
15.03 Interpret signature and imposition procedures.

16.0 CREATE AIR BRUSH ILLUSTRATIONS--The student will be able to:

16.01 Operate and maintain air brush and air supply.
16.02 Determine proper air brush technique.
16.03 Select proper surface and paint.
16.04 Apply masking materials.
16.05 Perform photo-retouching (color) (B+W).

17.0 DEMONSTRATE PROPER USE OF INDUSTRY TOOLS AND EQUIPMENT--The student will be able to:

17.01 Operate and maintain drafting equipment.
17.02 Utilize and read various scales.

18.0 DEMONSTRATE PROPER USE AND CARE OF INDUSTRY MATERIALS--The student will be able to:

18.01 Operate and maintain camera and processor (Photostats).
18.02 Operate and maintain galley art waxer.

19.0 DEMONSTRATE KNOWLEDGE OF CURRENT INDUSTRY STANDARDS, PRACTICES TECHNIQUES--The student will be able to:

19.01 Explain copyright procedures.
19.02 Utilize industry terminology.
19.03 Identify industry practice and procedures.
19.04 Explain importance of meeting deadlines.
19.05 Acquire up-to-date in-field technology.
19.06 Learn how to cope with stress.
19.07 Adjust to work conditions.
19.08 Adapt properly to interdepartmental communications.
19.09 Identify clip-art images.

20.0 DEMONSTRATE CREATIVE USE OF TYPOGRAPHY--The student will be able to:

20.01 Apply dry transfer lettering.
20.02 Develop knowledge of type styles.
20.03 Demonstrate knowledge of typographical specifications.
20.04 Develop knowledge of type construction design.
20.05 Allow proper letters and line spaces for typesetting.
20.06 Develop working knowledge of typespacing.

21.0 CREATE OUTDOOR ADVERTISING DESIGN--The student will be able to:

21.01 Develop billboard and poster design.
21.02 Prepare scale art.
21.03 Apply specific design principles to outdoor situations.

22.0 INTERPRET PHOTOGRAPHIC PROCEDURES--The student will be able to:

22.01 Coordinate photographic procedures with photographer.
22.02 Perform cropping and scaling.
22.03 Prepare art cards for multi-media.
22.04 Apply specification terminology.
22.05 Operate camera.
22.06 Identify graphic arts photo principles and practices.
22.07 Create an artistic photographic image.
22.08 Utilize the photographic procedures.
22.09 Produce a half-tone screen image.

23.0 APPLY MARKETING/ADVERTISING THEORIES--The student will be able to:

23.01 Apply marketing/advertising theories.
23.02 Identify customer needs.
23.03 Identify target market.
23.04 Prepare cost estimate.
23.05 Analyze marketing potential.

23.06 Recognize proper use of specialty services (supplies, specialties).
23.07 Identify marketing procedures.
23.08 Identify advertising procedures.
23.09 Interpret advertising agency skills and procedures.

24.0 APPLY COLOR THEORIES--The student will be able to:

24.01 Use color for impact.
24.02 Apply color symbolically (psychology).
24.03 Develop knowledge of color theory.
24.04 Apply color theory and appropriate principles for use in design.

25.0 DESIGN INDUSTRY LEVEL PORTFOLIOS--The student will be able to:

25.01 Demonstrate mounting and matting procedure.
25.02 Demonstrate industry presentation procedure and techniques.
25.03 Prepare industry level portfolio.

26.0 DESIGN TELEVISION GRAPHICS--The student will be able to:

26.01 Produce T.V. story boards.
26.02 Create T.V. art cards.

27.0 CREATE COMPUTER-AIDED LAYOUTS--The student will be able to:

27.01 Perform pagination.
27.02 Create color graphics.
27.03 Create computer illustration.

28.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

28.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
28.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
28.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
28.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
28.05 Demonstrate an understanding of federal, state and local taxes and their computation.

29.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

29.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
29.02 Draw conclusions or make inferences from data.
29.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
29.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

30.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

30.01 Conduct a job search.
30.02 Secure information about a job.

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30.03 Identify documents which may be required when applying for a job interview.
30.04 Complete a job application form correctly.
30.05 Demonstrate competence in job interview techniques.
30.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
30.07 Identify acceptable work habits.
30.08 Demonstrate knowledge of how to make appropriate job changes.
30.09 Demonstrate acceptable employee health habits.
30.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

31.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

31.01 Define entrepreneurship.
31.02 Describe the importance of entrepreneurship to the American economy.
31.03 List the advantages and disadvantages of business ownership.
31.04 Identify the risks involved in ownership of a business.
31.05 Identify the necessary personal characteristics of a successful entrepreneur.
31.06 Identify the business skills needed to operate a small business efficiently and effectively.

06120403CL July 1997

Florida Department of Education
CLUSTER CURRICULUM FRAMEWORK

Cluster Title:	Grooming And Salon Services
Cluster Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	Core, Three Programs, Three Occupational Completion Points

	Secondary	PSAV
Grade Level	9-12, 30, 31	30, 31
Facility Code	245	245
VSO	VICA	VICA
Coop Method	No	No
Apprenticeship	No	No

I. **PURPOSE:** The purpose of these programs is to prepare a person for employment as licensed hairdresser and cosmetologist (68005457), registered nails or facial specialist or to provide supplemental training for persons previously or currently employed in these occupations. Instruction is designed to qualify students for employment upon successfully passing the Florida cosmetology license examination or obtaining a registration from the State Board of Cosmetology.

The content includes, but is not limited to, communication skills, leadership skills, human relations skills and employability skills, safe and efficient work practices, Florida cosmetology law and rules, acquisition of knowledge of cosmetology/nails specialist/facial specialist and their related chemistry, bacteriology, anatomy and physiology, art of make-up, and development of skill in performing the manipulative and electrical techniques required in the practice of cosmetology/nail specialist and facial specialist occupations.

This cluster focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Cosmetology industry; planning, management, finance, technical and production skills, underlying technological principles, labor, community, health, safety, and environmental issues.

II. **CLUSTER STRUCTURE:** This cluster is a planned sequence of instruction consisting of a core and three programs. When the recommended sequence is followed, the structure will allow students to complete the required core and continue in the program of choice. A student must complete the training program in which enrolled to become an occupational completer.

Students must complete the core, or demonstrate the mastery of skills standards contained in the core, before advancing in any of the three programs: Cosmetology, Nails Specialty or Facial Specialty.

Students satisfactorily completing either the Nails Specialty or Facial Specialty programs may, at the option of the receiving schools, be given credit for that respective phase of instruction should they subsequently enroll in a cosmetology program.

The following diagram illustrates the cluster structure:

GROOMING AND SALON SERVICES

1

When offered at the secondary level, the programs in this cluster consist of the following courses which include the core:

8757200 Cosmetology 95-96

- 8757210 - Grooming and Salon Services Core 1 (.5 credit)
- 8757220 - Cosmetology 2 95-96 (.5 credit)
- 8757230 - Cosmetology 3 95-96 (1 credit)
- 8757240 - Cosmetology 4 95-96 (1 credit)
- 8757250 - Cosmetology 5 95-96 (1 credit)
- 8757260 - Cosmetology 6 95-96 (1 credit)
- 8757270 - Cosmetology 7 95-96 (1 credit)
- 8757280 - Cosmetology 8 95-96 (1 credit)
- 8757290 - Cosmetology 9 (1 credit)

8757300 Nails Specialty

8757210 - Grooming and Salon Services Core 1 (.5 credit)
8757310 - Nails Specialty 2 (.5 credit)
8757320 - Nails Specialty 3 (1 credit)

8757400 Facials Specialty

8757210 - Grooming and Salon Services Core 1 (.5 credit)
8757410 - Facial Specialty 2 (.5 credit)
8757420 - Facial Specialty 3 (1 credit)

III. **LABORATORY ACTIVITIES:** Instruction and learning activities are provided in a laboratory setting using hands-on experiences with chemicals, implements, and equipment appropriate to the programs' content and in accordance with safety and sanitation practices in the trade.

IV. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The programs in this cluster may be offered in PSAV courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

Planned and supervised instructional activities must be provided through one or more of the following: (1) directed laboratory experience, (2) student projects, (3) placement for experience.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade levels required for postsecondary adult vocational students to exit the programs in this cluster are listed at the program level. These grade level numbers correspond to a grade equivalent score obtained on one of the state designated basic skills examinations. If a student does not meet the basic skills level required for completion from the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) lab or prior to admission in an Adult Basic Education (ABE) setting.

When a student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards which the student must master to earn credit must be specified in the student's individual educational plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

To be transferable statewide between institutions, these programs/courses must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude

institutions from developing specific program or course articulation agreements with each other.

SCANS Competencies: Instructional strategies for these program must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate the methods to improve students' personal qualities and high-order thinking skills.

July 1997

Florida Department of Education
INTENDED OUTCOMES

Program Title: Cosmetology 95-96

	Secondary	PSAV
Program Numbers	**8757200**	**I120404**
CIP Number	0612.040303	0612.040303
Grade Level	9-12, 30, 31	30, 31
Length	8 Credits	1200 Hours
Certification	COSMETOL @7 G PERS SERV @7 G	COSMETOL @7 G PERS SERV @7 G
Basic Skills		
Math		8
Language		8
Reading		9

INTENDED OUTCOMES: After successfully completing appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
HAIRDRESSER AND COSMETOLOGIST - OES Code 68005457

01.0 Identify career opportunities.
02.0 Employ safe and proper laboratory practices.
03.0 Demonstrate appropriate understanding of basic science as related to grooming and salon services.
04.0 Demonstrate knowledge of professional development (Employability Skills).
05.0 Demonstrate an understanding of entrepreneurship -- management skills.
06.0 Demonstrate knowledge of Florida Law and State Board requirements.
07.0 Identify and perform shampoo/hair conditioners and scalp treatment.
08.0 Identify and perform trimming/shaping hair (cutting).
09.0 Identify and perform hair styles.
10.0 Identify and prepare hair pieces, wigs and hair attachments.
11.0 Identify and perform permanent waving/reconstruction curl/chemical relaxing.
12.0 Identify and apply temporary/semi-permanent and permanent color/bleach and specialty color techniques.
13.0 Perform manicure/pedicure and apply artificial nails/nail wraps.
14.0 Identify and perform facials, manipulation, make-up, hair removal, artificial las

July 1997
Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Cosmetology 1995-96
Secondary Number: 8757200
Postsecondary Number: I120404

OCCUPATIONAL COMPLETION POINT - DATA CODE A
HAIRDRESSER AND COSMETOLOGIST - OES Code 68005457

01.0 IDENTIFY CAREER OPPORTUNITIES--The student will be able to:

01.01 Identify career opportunities in the grooming and salon services field.

02.0 EMPLOY SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

02.01 Observe and apply sanitation and shop safety rules in all procedures.
02.02 Set up and operate equipment and utilize materials.
02.03 Clean and maintain implements and equipment.
02.04 Demonstrate professional ethics with patrons and co-workers.
02.05 Identify the histology/trichology of skin, hair and nails.

03.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE AS RELATED TO GROOMING AND SALON SERVICES--The student will be able to:

03.01 Identify basic science as it applies to decontamination and infection control.
03.02 Identify basic chemistry as it applies to products used in the salon.
03.03 Identify basic science as it applies to anatomy and physiology.
03.04 Identify basic science as it applies to electricity and light therapy to perform appropriate treatment.
03.05 Identify basic math skills as it applies to grooming and salon services.

04.0 DEMONSTRATE KNOWLEDGE OF PROFESSIONAL DEVELOPMENT (EMPLOYABILITY SKILLS)--The student will be able to:

04.01 Perform safety and health practices.
04.02 Understand employment capabilities.
04.03 Demonstrate appropriate work behavior.
04.04 Project a professional image.
04.05 Work individually and cooperatively as a member of regular or cultural diverse team.
04.06 Utilize communication skills applicable to the industry.
04.07 Balance personal and professional life.
04.08 Use and conserve resources and energy.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP-MANAGEMENT SKILLS--The student will be able to:

05.01 Define entrepreneurship-management skills.
05.02 Describe the importance of entrepreneurship to the American economy.
05.03 List the advantages and disadvantages of business ownership.
05.04 Identify the risks involved in ownership of a business.
05.05 Identify the necessary personal characteristics of a successful entrepreneur.
05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 DEMONSTRATE KNOWLEDGE OF FLORIDA LAW AND STATE BOARD REQUIREMENTS--The student will be able to:

06.01 Demonstrate working knowledge of Florida Law, Chapter 477.
06.02 Demonstrate Universal HIV-AIDS Precaution Procedures for the salon and knowledge of appropriate behavior in dealing with persons who may have the virus or syndrome.
06.03 Demonstrate knowledge of the "Florida Right-to-Know" Law, Chapter 442.

07.0 IDENTIFY AND PERFORM SHAMPOO/HAIR CONDITIONERS AND SCALP TREATMENTS--The student will be able to:

07.01 Prepare the client for service.
07.02 Analyze and recognize hair and scalp condition.
07.03 Select appropriate products (shampoo, conditioners, scalp treatments).
07.04 Apply shampoo and manipulate to cleanse hair and scalp.
07.05 Rinse shampoo thoroughly from hair and scalp.
07.06 Select appropriate hair or scalp conditioners/treatment (reconstructor, acid rinse, moisturizer, detangler, oily scalp, dry scalp, or dandruff treatment).
07.07 Apply treatment or conditioner according to manufacturer's directions.
07.08 Perform scalp manipulation, if required.
07.09 Set up and operate electrical equipment as required (high frequency currents, ultra violet or infra red rays).
07.10 Remove conditioner or treatment, if required.

08.0 IDENTIFY AND PERFORM HAIR SHAPING (CUTTING)--The student will be able to:

08.01 Prepare the client and determine needs and desires (consultation).
08.02 Select and utilize hair cutting implements and techniques using scissors, razors, clippers, and texturizing implements.
08.03 Section hair and proceed with wet or dry hair cut utilizing all elevations (solid form, graduated, layered, over-directed) and combinations with or without blends.
08.04 Edge and clean neckline with razor, clipper or scissors.
08.05 Check completed cut.
08.06 Sanitize cutting implements using Universal Sanitation Procedures.

09.0 IDENTIFY AND PERFORM HAIR STYLES--The student will be able to:

09.01 Prepare client and determine needs and desired style (consultation).
09.02 Identify and perform wet set using principles of design (hair sculpting, rollers and fingerwaves).
09.03 Prepare and perform thermal styling using electric rollers, blow dryers, curling irons, crimping irons, thermo-pressing combing, air-waving combs using principles of design.
09.04 Comb out into desired style.
09.05 Utilize braiding technique.
09.06 Style hairpieces.
09.07 Attach and blend hairpiece into desired style.

10.0 IDENTIFY AND PREPARE HAIR PIECES, WIGS AND HAIR ATTACHMENTS--The student will be able to:

10.01 Determine and identify styles and colors of wigs and hair pieces.
10.02 Measure the head and fit wig or hair piece.
10.03 Clean, shape, and style to client's features.
10.04 Attach and blend hair pieces/extensions into desired style.

11.0 IDENTIFY AND PERFORM PERMANENT WAVING/RECONSTRUCTION CURL/CHEMICAL RELAXING--The student will be able to:

11.01 Prepare client and determine needs and desired style (consultation).
11.02 Analyze hair, check scalp.
11.03 Select appropriate solution strength according to hair texture, desired results.
11.04 Perform shampoo and shaping as required.
11.05 Apply protective cream or lotion.
11.06 Apply rearranger or straightener as required for desired results following curl or chemical relaxer.
11.07 Strand test for straightness if performing reconstruction curl or chemical relaxer.
11.08 Rinse or shampoo according to manufacturer's directions.
11.09 Select rods and wrap hair, if required, according to manufacturer's directions.
11.10 Apply processing solution and process, take test curls.
11.11 Rinse, blot, shampoo and/or neutralize.
11.12 Remove rods, condition-normalize and style, record results.
11.13 Apply leave-on treatment, if required. Record results.

12.0 IDENTIFY AND APPLY TEMPORARY/SEMI-PERMANENT AND PERMANENT COLOR/BLEACH AND SPECIALTY COLOR TECHNIQUES--The student will be able to:

12.01 Perform patch test (pre-disposition), if required.
12.02 Prepare patron, determine needs and desires (consultation).
12.03 Analyze scalp and hair.
12.04 Select and assemble appropriate solutions according to hair texture and desired results.

12.05 Section hair, if required.
12.06 Mix, if required, and apply color, toner, and/or bleach according to manufacturer's directions.
12.07 Perform strand tests.
12.08 Identify and perform specialty coloring techniques.
12.09 Shampoo before or after applying color according to manufacturer's directions. Record results.
12.10 Condition-normalize, style and record results.

13.0 PERFORM MANICURE/PEDICURE AND APPLY ARTIFICIAL NAILS/NAIL WRAPS--The student will be able to:

13.01 Prepare client, determine needs and desires (consultation).
13.02 Sanitize, assemble supplies and equipment.
13.03 Remove polish/clean under nails.
13.04 Soften, push back cuticles (do not use metal pusher), trim hangnails, shape nails.
13.05 Smooth or buff nails.
13.06 Sanitize, soak and clean feet and under nails (pedicure).
13.07 Prepare nails.
13.08 Size and apply artificial nails according to manufacturer's directions.
13.09 Apply nail wraps and/or mending according to manufacturer's directions.
13.10 Apply nail forms/caps, if required.
13.11 Apply sculptured nail product, shape and buff.
13.12 Apply product to form and overlay according to manufacturer's directions.
13.13 Remove artificial nails.
13.14 Manipulate hands/feet.
13.15 Apply polish and/or nail art.
13.16 Inform clients of safe nail maintenance.

14.0 IDENTIFY AND PERFORM FACIALS, MANIPULATION, MAKE-UP, HAIR REMOVAL, ARTIFICIAL LASH APPLICATION--The student will be able to:

FACIAL TREATMENTS

14.01 Prepare the client.
14.02 Identify and diagnose skin condition.
14.03 Assemble supplies and equipment.
14.04 Cleanse face and neck.
14.05 Perform designated treatment (mechanical or manual).
14.06 Perform final cleansing of face and neck.

HAIR REMOVAL, ARTIFICIAL LASH APPLICATION

14.07 Perform eyebrow and lash treatment (tint/apply synthetic eyelashes).
14.08 Perform eyebrow tweezing and waxing.
14.09 Remove superfluous hair (using chemicals or wax).

FACIAL MAKE-UP

14.10 Prepare client.
14.11 Identify and diagnose skin condition.
14.12 Assemble supplies and equipment.
14.13 Perform a color analysis and facial balance.
14.14 Apply basic and/or corrective make-up.
14.15 Apply evening and glamour make-up.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757210
Course Title: Grooming and Salon Services Core 1
Course Credit: .5

COURSE DESCRIPTION:

This course is designed to provide the student with an opportunity to become familiar with competencies in employability, communication and math skills required to succeed in industry. It is also designed to provide the student with an overview of competencies in State Board of Cosmetology requirements and in the study of the cosmetology law and rules and regulations. He/she will briefly review entrepreneurship competency.

01.0 IDENTIFY CAREER OPPORTUNITIES--The student will be able to:

01.01 Identify career opportunities in the grooming and salon services field.

02.0 EMPLOY SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

02.01 Observe and apply sanitation and shop safety rules in all procedures.
02.02 Set up and operate equipment and utilize materials.
02.03 Clean and maintain implements and equipment.
02.04 Demonstrate professional ethics with patrons and co-workers.
02.05 Identify the histology/trichology of skin, hair and nails.

03.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE AS RELATED TO GROOMING AND SALON SERVICES--The student will be able to:

03.01 Identify basic science as it applies to decontamination and infection control.
03.02 Identify basic chemistry as it applies to products used in the salon.
03.03 Identify basic science as it applies to anatomy and physiology.
03.04 Identify basic science as it applies to electricity and light therapy to perform appropriate treatment.
03.05 Identify basic math skills as it applies to grooming and salon services.

04.0 DEMONSTRATE KNOWLEDGE OF PROFESSIONAL DEVELOPMENT (EMPLOYABILITY SKILLS)--The student will be able to:

04.01 Perform safety and health practices.
04.02 Understand employment capabilities.
04.03 Demonstrate appropriate work behavior.
04.04 Project a professional image.

04.05 Work individually and cooperatively as a member of regular or cultural diverse team.
04.06 Utilize communication skills applicable to the industry.
04.07 Balance personal and professional life.
04.08 Use and conserve resources and energy.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP-MANAGEMENT SKILLS--The student will be able to:

05.01 Define entrepreneurship-management skills.
05.02 Describe the importance of entrepreneurship to the American economy.
05.03 List the advantages and disadvantages of business ownership.
05.04 Identify the risks involved in ownership of a business.
05.05 Identify the necessary personal characteristics of a successful entrepreneur.
05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 DEMONSTRATE KNOWLEDGE OF FLORIDA LAW AND STATE BOARD REQUIREMENTS--The student will be able to:

06.01 Demonstrate working knowledge of Florida Law, Chapter 477.
06.02 Demonstrate Universal HIV-AIDS Precaution Procedures for the salon and knowledge of appropriate behavior in dealing with persons who may have the virus or syndrome.
06.03 Demonstrate knowledge of the "Florida Right-to-Know" Law, Chapter 442.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757220
Course Title: Cosmetology 2 95-96
Course Credit: .5

COURSE DESCRIPTION:

This course is designed to provide instruction in school, classroom/laboratory safety rules and procedures. It also provides an opportunity to learn competencies in hair shampooing and scalp treatments.

02.0 EMPLOY SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

- 02.01 Observe and apply sanitation and shop safety rules in all procedures.
- 02.02 Set up and operate equipment and utilize materials.
- 02.03 Clean and maintain implements and equipment.
- 02.04 Demonstrate professional ethics with patrons and co-workers.
- 02.05 Identify the histology/trichology of skin, hair and nails.

07.0 IDENTIFY AND PERFORM SHAMPOO/HAIR CONDITIONERS AND SCALP TREATMENTS--The student will be able to:

- 07.01 Prepare the client for service.
- 07.02 Analyze and recognize hair and scalp condition.
- 07.03 Select appropriate products (shampoo, conditioners, scalp treatments).
- 07.04 Apply shampoo and manipulate to cleanse hair and scalp.
- 07.05 Rinse shampoo thoroughly from hair and scalp.
- 07.06 Select appropriate hair or scalp conditioners/treatment (reconstructor, acid rinse, moisturizer, detangler, oily scalp, dry scalp, or dandruff treatment).
- 07.07 Apply treatment or conditioner according to manufacturer's directions.
- 07.08 Perform scalp manipulation, if required.
- 07.09 Set up and operate electrical equipment as required (high frequency currents, ultra violet or infra red rays).
- 07.10 Remove conditioner or treatment, if required.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757230
Course Title: Cosmetology 3 95-96
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in school, classroom/laboratory safety rules and procedures. It also provides an opportunity to learn competencies in hairshaping and instruction in the selection of proper hair cutting, implements and proper style selection.

02.0 EMPLOY SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

- 02.01 Observe and apply sanitation and shop safety rules in all procedures.
- 02.02 Set up and operate equipment and utilize materials.
- 02.03 Clean and maintain implements and equipment.
- 02.04 Demonstrate professional ethics with patrons and co-workers.
- 02.05 Identify the histology/trichology of skin, hair and nails.

08.0 IDENTIFY AND PERFORM HAIR SHAPING (CUTTING)--The student will be able to:

- 08.01 Prepare the client and determine needs and desires (consultation).
- 08.02 Select and utilize hair cutting implements and techniques using scissors, razors, clippers, and texturizing implements.
- 08.03 Section hair and proceed with wet or dry hair cut utilizing all elevations (solid form, graduated, layered, over-directed) and combinations with or without blends.
- 08.04 Edge and clean neckline with razor, clipper or scissors.
- 08.05 Check completed cut.
- 08.06 Sanitize cutting implements using Universal Sanitation Procedures.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757240
Course Title: Cosmetology 4 95-96
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in school, classroom/laboratory safety rules and procedures. It gives the student an opportunity to develop competencies in hairstyling.

02.0 EMPLOY SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

- 02.01 Observe and apply sanitation and shop safety rules in all procedures.
- 02.02 Set up and operate equipment and utilize materials.
- 02.03 Clean and maintain implements and equipment.
- 02.04 Demonstrate professional ethics with patrons and co-workers.
- 02.05 Identify the histology/trichology of skin, hair and nails.

09.0 IDENTIFY AND PERFORM HAIR STYLES--The student will be able to:

- 09.01 Prepare client and determine needs and desired style (consultation).
- 09.02 Identify and perform wet set using principles of design (hair sculpting, rollers and fingerwaves).
- 09.03 Prepare and perform thermal styling using electric rollers, blow dryers, curling irons, crimping irons, thermo-pressing combing, air-waving combs using principles of design.
- 09.04 Comb out into desired style.
- 09.05 Utilize braiding technique.
- 09.06 Style hairpieces.
- 09.07 Attach and blend hairpiece into desired style.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757250
Course Title: Cosmetology 5 95-96
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in school, classroom/laboratory safety rules and procedures. It gives the student an opportunity to develop competencies in preparation and principles of design and fitting of wigs and hair pieces.

02.0 EMPLOY SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

- 02.01 Observe and apply sanitation and shop safety rules in all procedures.
- 02.02 Set up and operate equipment and utilize materials.
- 02.03 Clean and maintain implements and equipment.
- 02.04 Demonstrate professional ethics with patrons and co-workers.
- 02.05 Identify the histology/trichology of skin, hair and nails.

10.0 IDENTIFY AND PREPARE HAIR PIECES, WIGS AND HAIR ATTACHMENTS--The student will be able to:

- 10.01 Determine and identify styles and colors of wigs and hair pieces.
- 10.02 Measure the head and fit wig or hair piece.
- 10.03 Clean, shape, and style to client's features.
- 10.04 Attach and blend hair pieces/extensions into desired style.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757260
Course Title: Cosmetology 6 95-96
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in school, classroom/laboratory safety rules and procedures. This course is designed to provide competencies in permanent waving/ reconstruction curl/chemical relaxing. Instruction in analyzing the hair, selection of approximate solutions and implements are also provided.

02.0 EMPLOY SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

- 02.01 Observe and apply sanitation and shop safety rules in all procedures.
- 02.02 Set up and operate equipment and utilize materials.
- 02.03 Clean and maintain implements and equipment.
- 02.04 Demonstrate professional ethics with patrons and co-workers.
- 02.05 Identify the histology/trichology of skin, hair and nails.

11.0 IDENTIFY AND PERFORM PERMANENT WAVING/RECONSTRUCTION CURL/ CHEMICAL RELAXING--The student will be able to:

- 11.01 Prepare client and determine needs and desired style (consultation).
- 11.02 Analyze hair, check scalp.
- 11.03 Select appropriate solution strength according to hair texture, desired results.
- 11.04 Perform shampoo and shaping as required.
- 11.05 Apply protective cream or lotion.
- 11.06 Apply rearranger or straightener as required for desired results following curl or chemical relaxer.
- 11.07 Strand test for straightness if performing reconstruction curl or chemical relaxer.
- 11.08 Rinse or shampoo according to manufacturer's directions.
- 11.09 Select rods and wrap hair, if required, according to manufacturer's directions.
- 11.10 Apply processing solution and process, take test curls.
- 11.11 Rinse, blot, shampoo and/or neutralize.
- 11.12 Remove rods, condition-normalize and style, record results.
- 11.13 Apply leave-on treatment, if required. Record results.

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July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757270
Course Title: Cosmetology 7 95-96
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in school, classroom/laboratory safety rules and procedures. The student will also have an opportunity to develop competencies in all types of hair coloring and bleaching. This instruction includes analysis of hair and scalp, performance of predisposition test, selection of correct supplies and equipment.

02.0 EMPLOY SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

- 02.01 Observe and apply sanitation and shop safety rules in all procedures.
- 02.02 Set up and operate equipment and utilize materials.
- 02.03 Clean and maintain implements and equipment.
- 02.04 Demonstrate professional ethics with patrons and co-workers.
- 02.05 Identify the histology/trichology of skin, hair and nails.

12.0 IDENTIFY AND APPLY TEMPORARY/SEMI-PERMANENT AND PERMANENT COLOR/BLEACH AND SPECIALTY COLOR TECHNIQUES--The student will be able to:

- 12.01 Perform patch test (pre-disposition), if required.
- 12.02 Prepare patron, determine needs and desires (consultation).
- 12.03 Analyze scalp and hair.
- 12.04 Select and assemble appropriate solutions according to hair texture and desired results.
- 12.05 Section hair, if required.
- 12.06 Mix, if required, and apply color, toner, and/or bleach according to manufacturer's directions.
- 12.07 Perform strand tests.
- 12.08 Identify and perform specialty coloring techniques.
- 12.09 Shampoo before or after applying color according to manufacturer's directions. Record results.
- 12.10 Condition-normalize, style and record results.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757280
Course Title: Cosmetology 8 95-96
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in school, classroom/laboratory safety rules and procedures. This course is designed to provide competencies in manicuring and pedicuring and in applying artificial nails and nail wraps. This instruction includes selection of supplies and equipment, sanitation procedures and performing designated procedures.

02.0 EMPLOY SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

- 02.01 Observe and apply sanitation and shop safety rules in all procedures.
- 02.02 Set up and operate equipment and utilize materials.
- 02.03 Clean and maintain implements and equipment.
- 02.04 Demonstrate professional ethics with patrons and co-workers.
- 02.05 Identify the histology/trichology of skin, hair and nails.

13.0 PERFORM MANICURE/PEDICURE AND APPLY ARTIFICIAL NAILS/NAIL WRAPS--The student will be able to:

- 13.01 Prepare client, determine needs and desires (consultation).
- 13.02 Sanitize, assemble supplies and equipment.
- 13.03 Remove polish/clean under nails.
- 13.04 Soften, push back cuticles (do not use metal pusher), trim hangnails, shape nails.
- 13.05 Smooth or buff nails.
- 13.06 Sanitize, soak and clean feet and under nails (pedicure.)
- 13.07 Prepare nails.
- 13.08 Size and apply artificial nails according to manufacturer's directions.
- 13.09 Apply nail wraps and/or mending according to manufacturer's directions.
- 13.10 Apply nail forms/caps, if required.
- 13.11 Apply sculptured nail product, shape and buff.
- 13.12 Apply product to form and overlay according to manufacturer's directions.
- 13.13 Remove artificial nails.
- 13.14 Manipulate hands/feet.
- 13.15 Apply polish and/or nail art.
- 13.16 Inform clients of safe nail maintenance.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757290
Course Title: Cosmetology 9
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in school, classroom/laboratory safety rules and procedures. This course is designed to provide the student with an opportunity to develop competencies in facials and makeup. This instruction includes selection of supplies and equipment, sanitation procedures and performing designated procedures.

02.0 EMPLOY SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

02.01 Observe and apply sanitation and shop safety rules in all procedures.
02.02 Set up and operate equipment and utilize materials.
02.03 Clean and maintain implements and equipment.
02.04 Demonstrate professional ethics with patrons and co-workers.
02.05 Identify the histology/trichology of skin, hair and nails.

14.0 IDENTIFY AND PERFORM FACIALS, MANIPULATION, MAKE-UP, HAIR REMOVAL, ARTIFICIAL LASH APPLICATION--The student will be able to:

FACIAL TREATMENTS

14.01 Prepare the client.
14.02 Identify and diagnose skin condition.
14.03 Assemble supplies and equipment.
14.04 Cleanse face and neck.
14.05 Perform designated treatment (mechanical or manual).
14.06 Perform final cleansing of face and neck.

HAIR REMOVAL, ARTIFICIAL LASH APPLICATION

14.07 Perform eyebrow and lash treatment (tint/apply synthetic eyelashes).
14.08 Perform eyebrow tweezing and waxing.
14.09 Remove superfluous hair (using chemicals or wax).

FACIAL MAKE-UP

14.10 Prepare client.
14.11 Identify and diagnose skin condition.
14.12 Assemble supplies and equipment.
14.13 Perform a color analysis and facial balance.
14.14 Apply basic and/or corrective make-up.

14.15 Apply evening and glamour make-up.

Florida Department of Education
INTENDED OUTCOMES

Program Title: Nails Specialty

	Secondary	PSAV
Program Numbers	**8757300**	**I120414**
CIP Number	0612.040304	0612.040304
Grade Level	9-12, 30, 31	30, 31
Length	2 Credits	240 Hours
Certification	COSMETOL @7 G	COSMETOL @7 G
	PERS SERV @7 G	PERS SERV @7 G
Basic Skills		
Math		8
Language		8
Reading		8

INTENDED OUTCOMES: After successfully completing appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
MANICURIST - OES Code 68008458

01.0 Identify career opportunities.
02.0 Employ safe and proper laboratory practices.
03.0 Demonstrate appropriate understanding of basic science as related to grooming and salon services.
04.0 Demonstrate knowledge of professional development (Employability Skills).
05.0 Demonstrate an understanding of entrepreneurship -- management skills.
06.0 Demonstrate knowledge of Florida Law and State Board requirements.
13.0 Describe and perform manicure, pedicures and nail extensions.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Nails Specialty
Secondary Number: 8757300
Postsecondary Number: I120414

OCCUPATIONAL COMPLETION POINT - DATA CODE A
MANICURIST - OES Code 68008458

01.0 IDENTIFY CAREER OPPORTUNITIES--The student will be able to:

01.01 Identify career opportunities in the grooming and salon services field.

02.0 EMPLOY SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

02.01 Observe and apply sanitation and shop safety rules in all procedures.
02.02 Set up and operate equipment and utilize materials.
02.03 Clean and maintain implements and equipment.
02.04 Demonstrate professional ethics with patrons and co-workers.
02.05 Identify the histology/trichology of skin, hair and nails.

03.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE AS RELATED TO GROOMING AND SALON SERVICES--The student will be able to:

03.01 Identify basic science as it applies to decontamination and infection control.
03.02 Identify basic chemistry as it applies to products used in the salon.
03.03 Identify basic science as it applies to anatomy and physiology.
03.04 Identify basic science as it applies to electricity and light therapy to perform appropriate treatment.
03.05 Identify basic math skills as it applies to grooming and salon services.

04.0 DEMONSTRATE KNOWLEDGE OF PROFESSIONAL DEVELOPMENT (EMPLOYABILITY SKILLS)--The student will be able to:

04.01 Perform safety and health practices.
04.02 Understand employment capabilities.
04.03 Demonstrate appropriate work behavior.
04.04 Project a professional image.
04.05 Work individually and cooperatively as a member of regular or cultural diverse team.
04.06 Utilize communication skills applicable to the industry.
04.07 Balance personal and professional life.
04.08 Use and conserve resources and energy.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP-MANAGEMENT SKILLS--The student will be able to:

05.01 Define entrepreneurship-management skills.
05.02 Describe the importance of entrepreneurship to the American economy.
05.03 List the advantages and disadvantages of business ownership.
05.04 Identify the risks involved in ownership of a business.
05.05 Identify the necessary personal characteristics of a successful entrepreneur.
05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 DEMONSTRATE KNOWLEDGE OF FLORIDA LAW AND STATE BOARD REQUIREMENTS--The student will be able to:

06.01 Demonstrate working knowledge of Florida Law, Chapter 477.
06.02 Demonstrate Universal HIV-AIDS Precaution Procedures for the salon and knowledge of appropriate behavior in dealing with persons who may have the virus or syndrome.
06.03 Demonstrate knowledge of the "Florida Right-to-Know" Law, Chapter 442.

13.0 PERFORM MANICURE/PEDICURE AND APPLY ARTIFICIAL NAILS/NAIL WRAPS--The student will be able to:

13.01 Prepare client, determine needs and desires (consultation).
13.02 Sanitize, assemble supplies and equipment.
13.03 Remove polish/clean under nails.
13.04 Soften, push back cuticles (do not use metal pusher), trim hangnails, shape nails.
13.05 Smooth or buff nails.
13.06 Sanitize, soak and clean feet and under nails (pedicure.)
13.07 Prepare nails.
13.08 Size and apply artificial nails according to manufacturer's directions.
13.09 Apply nail wraps and/or mending according to manufacturer's directions.
13.10 Apply nail forms/caps, if required.
13.11 Apply sculptured nail product, shape and buff.
13.12 Apply product to form and overlay according to manufacturer's directions.
13.13 Remove artificial nails.
13.14 Manipulate hands/feet.
13.15 Apply polish and/or nail art.
13.16 Inform clients of safe nail maintenance.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757210
Course Title: Grooming and Salon Services Core 1
Course Credit: .5

COURSE DESCRIPTION:

This course is designed to provide the student with an opportunity to become familiar with competencies in employability, communication and math skills required to succeed in industry. It is also designed to provide the student with an overview of competencies in State Board of Cosmetology requirements and in the study of the cosmetology law and rules and regulations. He/she will briefly review entrepreneurship competency.

01.0 IDENTIFY CAREER OPPORTUNITIES--The student will be able to:

01.01 Identify career opportunities in the grooming and salon services field.

02.0 EMPLOY SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

02.01 Observe and apply sanitation and shop safety rules in all procedures.
02.02 Set up and operate equipment and utilize materials.
02.03 Clean and maintain implements and equipment.
02.04 Demonstrate professional ethics with patrons and co-workers.
02.05 Identify the histology/trichology of skin, hair and nails.

03.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE AS RELATED TO GROOMING AND SALON SERVICES--The student will be able to:

03.01 Identify basic science as it applies to decontamination and infection control.
03.02 Identify basic chemistry as it applies to products used in the salon.
03.03 Identify basic science as it applies to anatomy and physiology.
03.04 Identify basic science as it applies to electricity and light therapy to perform appropriate treatment.
03.05 Identify basic math skills as it applies to grooming and salon services.

04.0 DEMONSTRATE KNOWLEDGE OF PROFESSIONAL DEVELOPMENT (EMPLOYABILITY SKILLS)--The student will be able to:

04.01 Perform safety and health practices.
04.02 Understand employment capabilities.
04.03 Demonstrate appropriate work behavior.
04.04 Project a professional image.

04.05 Work individually and cooperatively as a member of regular or cultural diverse team.
04.06 Utilize communication skills applicable to the industry.
04.07 Balance personal and professional life.
04.08 Use and conserve resources and energy.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP-MANAGEMENT SKILLS--The student will be able to:

05.01 Define entrepreneurship-management skills.
05.02 Describe the importance of entrepreneurship to the American economy.
05.03 List the advantages and disadvantages of business ownership.
05.04 Identify the risks involved in ownership of a business.
05.05 Identify the necessary personal characteristics of a successful entrepreneur.
05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 DEMONSTRATE KNOWLEDGE OF FLORIDA LAW AND STATE BOARD REQUIREMENTS--The student will be able to:

06.01 Demonstrate working knowledge of Florida Law, Chapter 477.
06.02 Demonstrate Universal HIV-AIDS Precaution Procedures for the salon and knowledge of appropriate behavior in dealing with persons who may have the virus or syndrome.
06.03 Demonstrate knowledge of the "Florida Right-to-Know" Law, Chapter 442.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757310
Course Title: Nails Specialty 2
Course Credit: .5

COURSE DESCRIPTION:

This course is designed to provide instruction in safety rules and procedures, school, classroom and laboratory procedures. It provides competencies in manicuring and pedicuring.

02.0 EMPLOY SAFE AND PROPER LABORATORY PRACTICES--The student will be able to:

- 02.01 Observe and apply sanitation and shop safety rules in all procedures.
- 02.02 Set up and operate equipment and utilize materials.
- 02.03 Clean and maintain implements and equipment.
- 02.04 Demonstrate professional ethics with patrons and co-workers.
- 02.05 Identify the histology/trichology of skin, hair and nails.

13.0 PERFORM MANICURE/PEDICURE AND APPLY ARTIFICIAL NAILS/NAIL WRAPS--The student will be able to:

- 13.01 Prepare client, determine needs and desires (consultation).
- 13.02 Sanitize, assemble supplies and equipment.
- 13.03 Remove polish/clean under nails.
- 13.04 Soften, push back cuticles (do not use metal pusher), trim hangnails, shape nails.
- 13.05 Smooth or buff nails.
- 13.06 Sanitize, soak and clean feet and under nails (pedicure.)
- 13.07 Prepare nails.

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STUDENT PERFORMANCE STANDARDS

Course Number: 8757320
Course Title: Nails Specialty 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in safety rules and procedures, school, classroom and laboratory procedures. It provides competencies in manicuring and nail extensions.

02.0 EMPLOY SAFE AND PROPER LABORATORY PRACTICES--The student will be able to:

- 02.01 Observe and apply sanitation and shop safety rules in all procedures.
- 02.02 Set up and operate equipment and utilize materials.
- 02.03 Clean and maintain implements and equipment.
- 02.04 Demonstrate professional ethics with patrons and co-workers.
- 02.05 Identify the histology/trichology of skin, hair and nails.

13.0 DESCRIBE AND PERFORM MANICURE, PEDICURE AND NAIL EXTENSIONS--The student will be able to:

- 13.08 Size and apply artificial nails according to manufacturer's directions.
- 13.09 Apply nail wraps and/or mending according to manufacturer's directions.
- 13.10 Apply nail forms/caps, if required.
- 13.11 Apply sculptured nail product, shape and buff.
- 13.12 Apply product to form and overlay according to manufacturer's directions.
- 13.13 Remove artificial nails.
- 13.14 Manipulate hands/feet.
- 13.15 Apply polish and/or nail art.
- 13.16 Inform clients of safe nail maintenance.

Florida Department of Education
INTENDED OUTCOMES

Program Title: Facials Specialty

	Secondary	PSAV
Program Numbers	**8757400**	**I120424**
CIP Number	0612.040305	0612.040305
Grade Level	9-12, 30, 31	30, 31
Length	2 Credits	260 Hours
Certification	COSMETOL @ 7G	COSMETOL @ 7G
	PERS SERV @ 7G	PERS SERV @ 7G
Basic Skills		
Math		8
Language		8
Reading		8

INTENDED OUTCOMES: After successfully completing appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
FACIALS SPECIALIST - Industry Tilte

01.0 Identify career opportunities.
02.0 Employ safe and proper laboratory practices.
03.0 Demonstrate appropriate understanding of basic science as related to grooming and salon services.
04.0 Demonstrate knowledge of professional development (Employability Skills).
05.0 Demonstrate an understanding of entrepreneurship -- management skills.
06.0 Demonstrate knowledge of Florida Law and State Board requirements.
14.0 Identify and perform facials, manipulations, make-up, hair removal, artificial lash application.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Facial Specialty
Secondary Number: 8757400
Postsecondary Number: I120424

OCCUPATIONAL COMPLETION POINT - DATA CODE A
FACIALS SPECIALIST - Industry Tilte

01.0 IDENTIFY CAREER OPPORTUNITIES--The student will be able to:

- 01.01 Identify career opportunities in the grooming and salon services field.

02.0 EMPLOY SAFE AND PROPER LABORATORY PRACTICES--The student will be able to:

- 02.01 Observe and apply sanitation and shop safety rules in all procedures.
- 02.02 Set up and operate equipment and utilize materials.
- 02.03 Clean and maintain implements and equipment.
- 02.04 Demonstrate professional ethics with patrons and co-workers.
- 02.05 Identify the histology/trichology of skin, hair and nails.

03.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE AS RELATED TO GROOMING AND SALON SERVICES--The student will be able to:

- 03.01 Understand molecular reactions as a result of physical and chemical changes.
- 03.02 Draw conclusions or make inferences from data.
- 03.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for ventilating and handling such materials.

04.0 DEMONSTRATE KNOWLEDGE OF PROFESSIONAL DEVELOPMENT (EMPLOYABILITY SKILLS)--The student will be able to:

- 04.01 Perform safety and health practices.
- 04.02 Locate and select employment opportunities.
- 04.03 Understand employment capabilities.
- 04.04 Demonstrate employment seeking skills.
- 04.05 Demonstrate appropriate work behavior.
- 04.06 Project a professional image.
- 04.07 Work individually and cooperatively as a member of regular or culturally diverse team.
- 04.08 Utilize communication skills applicable to the industry.
- 04.09 Utilize math skills applicable to the industry.
- 04.10 Adapt to change.
- 04.11 Balance personal and professional life.
- 04.12 Use and conserve resources and energy.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP-MANAGEMENT SKILLS--The student will be able to:

05.01 Define entrepreneurship.
05.02 Describe the importance of entrepreneurship to the American economy.
05.03 List the advantages and disadvantages of business ownership.
05.04 Identify the risks involved in ownership of a business.
05.05 Identify the necessary personal characteristics of a successful entrepreneur.
05.06 Identify the business skills needed to operate a small business efficiently and effectively.
05.07 Adapt to change.

06.0 DEMONSTRATE KNOWLEDGE OF FLORIDA LAW AND STATE BOARD REQUIREMENTS--The student will be able to:

06.01 Demonstrate working knowledge of Florida Law, Chapter 477.
06.02 Demonstrate Universal HIV-AIDS Precaution Procedures for the salon and knowledge of appropriate behavior in dealing with persons who may have the virus or syndrome.
06.03 Demonstrate knowledge of the "Florida Right-to-Know" Law, Chapter 442.

14.0 IDENTIFY AND PERFORM FACIALS, MANIPULATION, MAKE-UP, HAIR REMOVAL, ARTIFICIAL LASH APPLICATION--The student will be able to:

FACIAL TREATMENTS

14.01 Prepare the client.
14.02 Identify and diagnose skin condition.
14.03 Assemble supplies and equipment.
14.04 Cleanse face and neck.
14.05 Perform designated treatment (mechanical or manual).
14.06 Perform final cleansing of face and neck.

HAIR REMOVAL, ARTIFICIAL LASH APPLICATION

14.07 Perform eyebrow and lash treatment (tint/apply synthetic eyelashes).
14.08 Perform eyebrow tweezing and waxing.
14.09 Remove superfluous hair (using chemicals or wax).

FACIAL MAKE-UP

14.10 Prepare client.
14.11 Identify and diagnose skin condition.
14.12 Assemble supplies and equipment.
14.13 Perform a color analysis and facial balance.
14.14 Apply basic and/or corrective make-up.
14.15 Apply evening and glamour make-up.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757210
Course Title: Grooming and Salon Services Core 1
Course Credit: .5

COURSE DESCRIPTION:

This course is designed to provide the student with an opportunity to become familiar with competencies in employability, communication and math skills required to succeed in industry. It is also designed to provide the student with an overview of competencies in State Board of Cosmetology requirements and in the study of the cosmetology law and rules and regulations. He/she will briefly review entrepreneurship competency.

01.0 IDENTIFY CAREER OPPORTUNITIES--The student will be able to:

01.01 Identify career opportunities in the grooming and salon services field.

02.0 EMPLOY SAFE, SANITARY AND EFFICIENT WORK PRACTICES--The student will be able to:

02.01 Observe and apply sanitation and shop safety rules in all procedures.
02.02 Set up and operate equipment and utilize materials.
02.03 Clean and maintain implements and equipment.
02.04 Demonstrate professional ethics with patrons and co-workers.
02.05 Identify the histology/trichology of skin, hair and nails.

03.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE AS RELATED TO GROOMING AND SALON SERVICES--The student will be able to:

03.01 Identify basic science as it applies to decontamination and infection control.
03.02 Identify basic chemistry as it applies to products used in the salon.
03.03 Identify basic science as it applies to anatomy and physiology.
03.04 Identify basic science as it applies to electricity and light therapy to perform appropriate treatment.
03.05 Identify basic math skills as it applies to grooming and salon services.

04.0 DEMONSTRATE KNOWLEDGE OF PROFESSIONAL DEVELOPMENT (EMPLOYABILITY SKILLS)--The student will be able to:

04.01 Perform safety and health practices.
04.02 Understand employment capabilities.
04.03 Demonstrate appropriate work behavior.
04.04 Project a professional image.

04.05 Work individually and cooperatively as a member of regular or cultural diverse team.
04.06 Utilize communication skills applicable to the industry.
04.07 Balance personal and professional life.
04.08 Use and conserve resources and energy.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP-MANAGEMENT SKILLS--The student will be able to:

05.01 Define entrepreneurship-management skills.
05.02 Describe the importance of entrepreneurship to the American economy.
05.03 List the advantages and disadvantages of business ownership.
05.04 Identify the risks involved in ownership of a business.
05.05 Identify the necessary personal characteristics of a successful entrepreneur.
05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 DEMONSTRATE KNOWLEDGE OF FLORIDA LAW AND STATE BOARD REQUIREMENTS--The student will be able to:

06.01 Demonstrate working knowledge of Florida Law, Chapter 477.
06.02 Demonstrate Universal HIV-AIDS Precaution Procedures for the salon and knowledge of appropriate behavior in dealing with persons who may have the virus or syndrome.
06.03 Demonstrate knowledge of the "Florida Right-to-Know" Law, Chapter 442.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757410
Course Title: Facial Specialty 2
Course Credit: .5

COURSE DESCRIPTION:

This course is designed to provide instruction in safety rules and procedures, school, classroom/laboratory procedures. It provides competencies in facials and massage.

02.0 EMPLOY SAFE AND PROPER LABORATORY PRACTICES--The student will be able to:

- 02.01 Observe and apply sanitation and disinfection safety rules in all procedures.
- 02.02 Set up and operate equipment and utilize materials.
- 02.03 Clean and maintain implements and equipment.
- 02.04 Demonstrate professional ethics with patrons and co-workers.
- 02.05 Identify the histology of skin, hair and nails.

14.0 IDENTIFY AND PERFORM FACIALS, MANIPULATION, MAKE-UP, HAIR REMOVAL, ARTIFICIAL LASH APPLICATION--The student will be able to:

FACIAL TREATMENTS

- 14.01 Prepare the client.
- 14.02 Identify and diagnose skin condition.
- 14.03 Assemble supplies and equipment.
- 14.04 Cleanse face and neck.
- 14.05 Perform designated treatment (mechanical/electrical/chemical, or manual).
- 14.06 Perform final cleansing of face and neck.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8757420
Course Title: Facial Specialty 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide competencies in facial make-up, hair removal, artificial lash application and instruction in the selection of proper supplies and implements to perform this service.

02.0 EMPLOY SAFE AND PROPER LABORATORY PRACTICES--The student will be able to:

- 02.01 Observe and apply sanitation and disinfection safety rules in all procedures.
- 02.02 Set up and operate equipment and utilize materials.
- 02.03 Clean and maintain implements and equipment.
- 02.04 Demonstrate professional ethics with patrons and co-workers.
- 02.05 Identify the histology of skin, hair and nails.

14.0 IDENTIFY AND PERFORM FACIALS, MANIPULATION, MAKE-UP, HAIR REMOVAL, ARTIFICIAL LASH APPLICATION--The student will be able to:

HAIR REMOVAL, ARTIFICIAL LASH APPLICATION

- 14.07 Perform eyebrow and lash treatment (tint/apply synthetic eyelashes).
- 14.08 Perform eyebrow tweezing and waxing.
- 14.09 Remove superfluous hair (using chemicals or wax).

FACIAL MAKE-UP

- 14.10 Prepare client.
- 14.11 Identify and diagnose skin condition.
- 14.12 Assemble supplies and equipment.
- 14.13 Perform a color analysis and facial balance.
- 14.14 Apply basic and/or corrective make-up.
- 14.15 Apply evening and glamour make-up.

Florida Department of Education
CLUSTER CURRICULUM FRAMEWORK

Cluster Title:	Heating, Air-Conditioning, And Refrigeration Technology
Cluster Type:	Job Preparatory
Occupational Area:	Industrial Education
Components	Three Programs, One Core, Five Occupational Completion Points

	Secondary	PSAV
Grade Level	9-12, 30, 31	30, 31
Facility Code	203	203
VSO	VICA	VICA
Co-op Method	Yes	Yes
Apprenticeship	Yes	Yes

I. **PURPOSE:** The purpose of the programs in this cluster is to prepare students for employment or advanced training in the heating, air-conditioning (A/C), and refrigeration industry. The programs in this cluster prepare students for employment as Heating, A/C, and Refrigeration Helper (Industry Title), Heating, A/C, and Refrigeration Mechanic Assistant (Industry Title), Heating, A/C, and Refrigeration Mechanic (Industry Title), Commercial A/C Technician (OES 85902654), and Commercial Refrigeration Technician (OES 22511236).

The programs in this cluster also provide supplemental training for persons previously or currently employed in the heating, air-conditioning, and refrigeration industry. The student should obtain EPA certification prior to leaving school in order to be employed in any job that requires work with refrigerants.

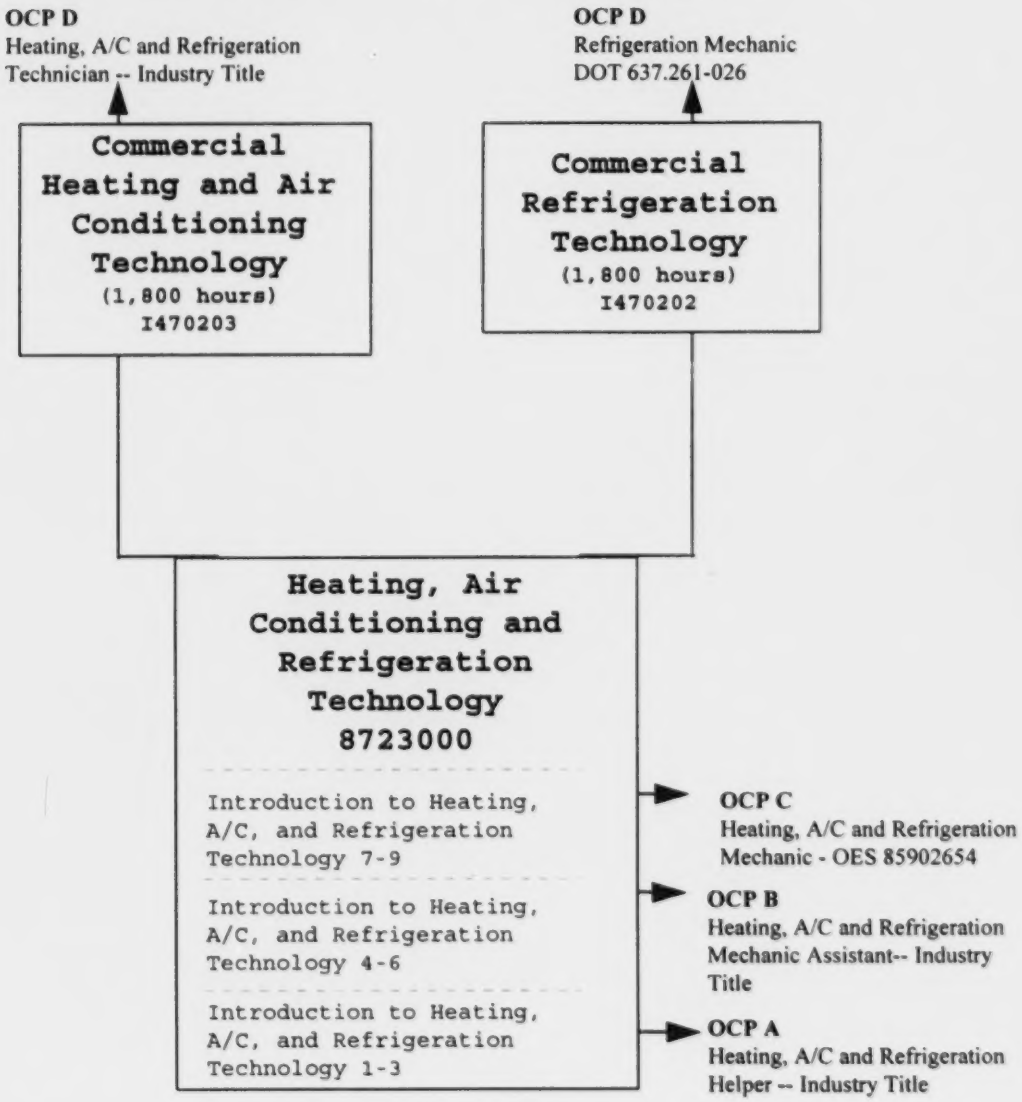
This cluster of programs focuses on broad, transferable skills, stresses the understanding of all aspects of the heating, air-conditioning, and refrigeration industry, and demonstrates elements of the industry such as planning, management, finance, technical and production skills, the underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

II. **CLUSTER STRUCTURE:** This cluster is a planned sequence of instruction consisting of two programs with one common core and five occupational completion points. The recommended sequence allows students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training program or terminate as an occupational completer.

It is recommended that students complete the core or demonstrate a mastery of the student performance standards contained in the core before advancing to the course(s) in the next level of either of the two programs: Commercial Air-Conditioning Technology or Commercial Refrigeration Technology.

The following diagram illustrates the cluster structure:

HEATING, AIR-CONDITIONING AND REFRIGERATION TECHNOLOGY


OCP D
Heating, A/C and Refrigeration Technician -- Industry Title
OCP D
Refrigeration Mechanic DOT 637.261-026
Commercial Heating and Air Conditioning Technology
(1,800 hours)
I470203
Commercial Refrigeration Technology
(1,800 hours)
I470202
Heating, Air Conditioning and Refrigeration Technology
8723000
Introduction to Heating, A/C, and Refrigeration Technology 7-9
Introduction to Heating, A/C, and Refrigeration Technology 4-6
Introduction to Heating, A/C, and Refrigeration Technology 1-3
OCP C
Heating, A/C and Refrigeration Mechanic - OES 85902654
OCP B
Heating, A/C and Refrigeration Mechanic Assistant-- Industry Title
OCP A
Heating, A/C and Refrigeration Helper -- Industry Title

At the secondary level, this cluster consists of the following courses, which include the core:

Heating, A/C and Refrigeration Technology - 9 secondary credits

CORE COURSES

8713010 Introduction to Heating, A/C, and Refrigeration Technology 1
8713020 Introduction to Heating, A/C, and Refrigeration Technology 2
8713030 Introduction to Heating, A/C, and Refrigeration Technology 3
8713040 Introduction to Heating, A/C, and Refrigeration Technology 4
8713050 Introduction to Heating, A/C, and Refrigeration Technology 5
8713060 Introduction to Heating, A/C, and Refrigeration Technology 6

INTERMEDIATE COURSES

8713070 Intermediate Heating, A/C, and Refrigeration Technology 7
8713080 Intermediate Heating, A/C, and Refrigeration Technology 8
8713090 Intermediate Heating, A/C, and Refrigeration Technology 9

III. **LABORATORY ACTIVITIES:** Classroom, shop, and laboratory activities are an integral part of this cluster. These activities include instruction in the use of safety procedures and in the care of tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation. A generic equipment list for the programs in this cluster is available.

IV. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., (VICA) is the appropriate vocational student organization (VSO) for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The Refrigeration Service Engineers Society (RSES), a professional organization geared toward the education of teachers, provides opportunities for students to become members and to participate in RSES activities. The Air-Conditioning Refrigeration Institute (ARI) is another organization that provides educational opportunities, curricula, and competency exams for the industry.

The programs in this cluster may be offered in postsecondary adult vocational (PSAV) courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The cooperative method of instruation is approprate for this program. Whenever the cooperative method is offered, the following is required for each student: a traiing agreement, a training plan signed by the student, teacher, and employer, including instructional objectives and a list of on-the-job learning experiences and a work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. the student must be paid for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic-skills grade levels required for postsecondary adult vocational students to exit the programs in this cluster are listed before the intended outcomes for each program. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion of the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) or a remedial lab. Please refer to the Rule for exemptions.

When a secondary student with a disability is enrolled in a vocational class for which modifications to the curriculum framework have been made, the particular outcomes and student performance standards that the student must master to earn credit must be specified in the student's individual educational plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

SCANS Competencies: To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this cluster must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

July 1997

Florida Department of Education
INTENDED OUTCOMES

Program Title: HEATING, A/C, AND REFRIGERATION TECHNOLOGY

	Secondary
Program Number:	**8723000**
CIP Number:	0647020303
Grade Level	9-12, 30, 31
Length	9 Credits
Certification	AC HEAT ME @7 G
	REFRG MECH @7 G

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Heating, A/C, and Refrigeration Helper - Industry Title

01.0 Identify safe working conditions and follow safety practices.
02.0 Describe the history and concepts of heating, air-conditioning, and refrigeration.
03.0 Identify, use, and maintain the hand tools and tool accessories used in the heating, air-conditioning, and refrigeration industry.
04.0 Demonstrate an understanding of matter and heat behavior.
05.0 Demonstrate a working knowledge of fluids, pressures, refrigerants, and related codes.
06.0 Fabricate and service the piping, tubing, and fittings used in the heating, air-conditioning, and refrigeration industry.
07.0 Demonstrate a working knowledge of heating, air-conditioning, and refrigeration system components and accessories.
08.0 Apply appropriate communication and computer skills.
09.0 Demonstrate an understanding of entrepreneurship.
10.0 Demonstrate employability skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Heating, A/C, and Refrigeration Mechanic Assistant - Industry Title

11.0 Demonstrate a practical knowledge of basic electricity and of the electrical components of heating, air-conditioning, and refrigeration equipment.
12.0 Troubleshoot heating, air-conditioning, and refrigeration electrical control systems and their components.
13.0 Troubleshoot and wire electrical motors and their components.
14.0 Assist in the installation of a residential heating and air-conditioning system and determine start-up procedures.
15.0 Demonstrate a working knowledge of mechanical heating and air-conditioning system operations and of start-up and check-out procedures.
16.0 Size heating, air-conditioning, and refrigeration piping.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
Heating, A/C, and Refrigeration Mechanic - OES 85902654

17.0 Demonstrate a practical knowledge of solid-state electronics as used in heating, air-conditioning, and refrigeration systems.
18.0 Utilize and operate mechanical refrigeration servicing and testing equipment.
19.0 Use combustion-type heating servicing and testing equipment.
20.0 Troubleshoot gas valves and regulators as used in heating, air-conditioning, and refrigeration systems.
21.0 Determine the properties of air.
22.0 Use a pressure enthalpy chart to diagram refrigerant cycles.
23.0 Explain the standards for and ways to measure indoor-air quality.
24.0 Demonstrate the installation, maintenance, and repair of heating, air-conditioning, and refrigeration systems.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Heating, A/C And Refrigeration Technology
Secondary Number: 8723000

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Heating, A/C, and Refrigeration Helper - Industry Title

01.0 IDENTIFY SAFE WORKING CONDITIONS AND FOLLOW SAFETY PRACTICES--The student will be able to:

01.01 Identify and use good housekeeping practices in the laboratory.
01.02 Explain the reasons for regular safety meetings and for company safety policies.
01.03 Explain the need for employee-background checks and medical examinations.
01.04 Identify and use appropriate fire extinguishers and other such safety devices.
01.05 Identify and follow emergency and rescue procedures.
01.06 Identify and use safe-handling practices as they relate to hazardous and volatile fluids, compounds, and gases.
01.07 Apply specific safety and recovery practices for refrigerants used in the industry.
01.08 Apply specific safety practices as they relate to handling and storing cylinders and materials.
01.09 Select and wear proper protective clothing and equipment.
01.10 Identify and use specific safety practices when using soldering and brazing skills.
01.11 Identify and use Occupational Safety and Health Administration (OSHA) practices when working with heating, air-conditioning, and refrigeration systems and equipment.
01.12 Follow safety precautions when using hand and power tools.
01.13 Demonstrate an understanding of cardiopulmonary resuscitation (CPR) and first aid.

02.0 DESCRIBE THE HISTORY AND CONCEPTS OF HEATING, AIR-CONDITIONING, AND REFRIGERATION--The student will be able to:

02.01 Identify and explain the four major refrigeration components.
02.02 Identify and explain the characteristics of a compression-cycle refrigerant system.
02.03 Differentiate between air-conditioning and refrigeration.
02.04 Differentiate between split systems and package systems.
02.05 Describe the benefits of conditioned air and environments.
02.06 Discuss the impact of heating, air-conditioning, and refrigeration on society.
02.07 Discuss current issues and concerns (such as indoor-air quality, the ozone layer, and computer technology) in the heating, air-conditioning, and refrigeration industry and in the environment and explain their future ramifications.

02.08 Describe the purpose and requirements of local, state, and federal heating, air-conditioning, and refrigeration codes and standards and of the manufacturer's installation instructions.

02.09 Identify various professional organizations, associations, and societies, and explain their purposes.

03.0 IDENTIFY, USE, AND MAINTAIN THE TOOLS AND TOOL ACCESSORIES USED IN THE HEATING, AIR-CONDITIONING, AND REFRIGERATION INDUSTRY--The student will be able to:

03.01 Identify and use
- a. basic hand tools and tool accessories
- b. power tools (electric, mechanical, and pneumatic, if available)
- c. pipe and tube-working tools of the trade
- d. specialized tools of the trade

03.02 Apply appropriate care and maintenance procedures for tools and tool accessories, following the directions in the tool-equipment manufacturer's manual.

04.0 DEMONSTRATE AN UNDERSTANDING OF MATTER AND HEAT BEHAVIOR--The student will be able to:

04.01 Describe and explain freezing point, critical temperature, and absolute zero.

04.02 Describe matter, heat, and heat transfer.

04.03 Differentiate between heat and temperature.

04.04 Explain and distinguish among the characteristics of the three states of matter.

04.05 Explain the relationship between temperature and humidity.

04.06 Differentiate between latent heat and sensible heat.

05.0 DEMONSTRATE A WORKING KNOWLEDGE OF FLUIDS, PRESSURES, REFRIGERANTS, AND RELATED CODES--The student will be able to:

05.01 Identify the refrigeration cycle.

05.02 Identify and explain general safety issues and EPA rules and regulations regarding the handling of refrigerants.

05.03 Define and explain "pressure," "fluid," and "temperature."

05.04 Explain the standards for and ways to measure and calculate absolute and gauge pressures.

05.05 Identify and explain the classifications, properties, and uses of different refrigerants.

05.06 Explain how fluids react and flow in a closed versus an open environment or vessel.

05.07 Define and identify "color-coding" of refrigerant cylinders.

05.08 Compare pressure and temperature (P/T) charts.

05.09 Explain the proper methods of transferring, storing, and recovering refrigerants.

05.10 Explain the effects of an improper refrigerant and contaminants in a system.

06.0 FABRICATE AND SERVICE THE PIPING, TUBING, AND FITTINGS USED IN THE HEATING, AIR-CONDITIONING, AND REFRIGERATION INDUSTRY--The student will be able to:

06.01 Identify and explain the purpose of the piping, tubing, and fittings used in the heating, air-conditioning, and refrigeration industry.
06.02 Bend tubing, using tube benders.
06.03 Connect tubing, using
a. flared fittings
b. compression fittings
06.04 Connect tubing, using solderless connectors.
06.05 Connect tubing, using a swaged-joint connection.
06.06 Identify and use various types of torches.
06.07 Identify, select, and use appropriate soldering and brazing alloys, materials, and skills.
06.08 Explain the purposes and procedures for protecting piping materials and fabrication, such as valves, fittings, and products, from heat.
06.09 Solder and/or braze tubing, including aluminum.
06.10 Silver-braze brass, steel, and copper.
06.11 Demonstrate an understanding of the procedures for installing pipe and tubing insulation.
06.12 Explain the procedures required for installing heating, air-conditioning, refrigerant, and ventilation accessories.
06.13 Fabricate and leak-test the piping, tubing, and fittings used in the heating, air-conditioning, and refrigeration industry.
06.14 Maintain project time and materials lists.

07.0 DEMONSTRATE A WORKING KNOWLEDGE OF HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEM COMPONENTS AND ACCESSORIES--The student will be able to:

07.01 Explain the types, operation, use, and maintenance requirements of
a. compressors (such as reciprocating, rotary, screw, and scroll)
b. condensers and evaporators (such as evaporative condensers, evaporative coils, shell and tube, tube within a tube, and fin and tube)
c. metering devices (such as adjusting automatic and thermostatic expansion valves, fixed orifices, and other devices available on the local market)
07.02 Evaluate metering-device performance.
07.03 Explain the methods of compression, lubrication, and compressor loading and unloading.
07.04 Analyze the operating condition of a compressor.
07.05 Test, troubleshoot, and correct the causes of mechanical problems in a heating, air-conditioning, and refrigeration system.
07.06 Identify the location and explain the uses of refrigerant flow accessories.
07.07 Identify the location and explain the uses of heating, air-conditioning, and refrigeration-system accessories (such as

receivers, dryers/filers, solenoid valves, heat exchangers, accumulators, suction filter, oil separators, evaporator pressure-regulating valve, crankcase pressure-regulating valves, and check valves).

07.08 Evaluate system performance.

08.0 APPLY APPROPRIATE COMMUNICATION AND COMPUTER SKILLS--The student will be able to:

08.01 Ask and answer questions coherently and concisely.
08.02 Read and follow written instructions and listen to and follow oral instructions.
08.03 Make oral presentations.
08.04 Write reports, using a word-processing software.
08.05 Read and interpret industry-related materials.
08.06 Find information in technical literature, such as a manufacturer's manual.
08.07 Interpret graphs, charts, diagrams, and tables commonly used in the industry.
08.08 Fill out the forms and invoices commonly used in the industry.
08.09 Demonstrate appropriate telephone communications skills.
08.10 Use industry-related computer software.

09.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

09.01 Define "entrepreneurship."
09.02 Explain the importance of entrepreneurship to the United States economy.
09.03 Discuss the advantages and disadvantages of business ownership.
09.04 Explain the risks involved in the ownership of a business.
09.05 Identify the personal characteristics of a successful entrepreneur.
09.06 Identify the business skills needed to operate a small business efficiently and effectively.
09.07 Describe the employer's responsibilities to support the business and industry.
09.08 Demonstrate a working knowledge of state and local licensing requirements.

10.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

10.01 Conduct a job search and identify advanced-training opportunities and their requirements.
10.02 Calculate the employer's investment cost for an employee.
10.03 Secure information about a job, including employee benefits.
10.04 Write a resume.
10.05 Evaluate a job offer, considering various factors such as career advancement, job satisfaction, employee benefits, etc.
10.06 Demonstrate ethical and responsible practices.
10.07 Exhibit pride in the quality of work performed.
10.08 Describe the advantages of a good driving record and the ramifications of a poor driving record on employability opportunities.

10.09 Explain the Florida "Right-to-Know" law that describes the Material Safety Data Sheet (MSDS).
10.10 Explain the importance of confidentiality in the workplace.
10.11 Discuss the effects of positive human-relation skills on success in the business.
10.12 Demonstrate appropriate responses to performance evaluations from the employer, the supervisor, and other persons in the workplace.

OCCUPATIONAL COMPLETION POINT - DATA CODE B

Heating, A/C, and Refrigeration Mechanic Assistant - Industry Title

11.0 DEMONSTRATE A PRACTICAL KNOWLEDGE OF BASIC ELECTRICITY AND OF THE ELECTRICAL COMPONENTS OF HEATING, AIR-CONDITIONING, AND REFRIGERATION EQUIPMENT--The student will be able to:

11.01 Explain the principles of electricity.
11.02 Explain single- and three-phase power distribution.
11.03 Define and explain watts, ohms, volts, and amps.
11.04 Identify and explain electrical measuring tools and devices.
11.05 Explain the standards for and ways to measure watts, resistance, voltage, and amperage, using appropriate instruments or devices.
11.06 Identify and explain appropriate electrical wiring symbols.
11.07 Draw and explain a wiring schematic diagram for a control system.
11.08 Create a wiring schematic for each of the following, using all components and symbols for safe and effective operation and interpretation:
a. an air-conditioner
b. an electric furnace
c. a heat pump
d. an oil furnace
e. a gas furnace
11.09 Explain codes and standards and safety requirements for working with the electrical components used in heating, air conditioning, and refrigeration.
11.10 Troubleshoot protection devices, such as fuses and breakers.
11.11 Interpret tables and charts from the National Electrical Codes (NEC).

12.0 TROUBLESHOOT HEATING, AIR-CONDITIONING, AND REFRIGERATION ELECTRICAL CONTROL SYSTEMS AND THEIR COMPONENTS--The student will be able to:

12.01 Identify and explain the operations of electrical control systems and their components (such as heat anticipators, heat and cool thermostats, outdoor thermostats/low ambient controls, defrost controls/timers, and auxiliary heating controls).
12.02 Identify, install, and troubleshoot controls for heating, air-conditioning, and refrigeration systems.
12.03 Explain the operation of different types of electromechanical thermostats.
12.04 Wire basic heating, air-conditioning, and refrigeration systems.

12.05 Troubleshoot operational problems for different types of electromechanical thermostats.
12.06 Explain the electrical and mechanical operations of the basic heat pump.

13.0 TROUBLESHOOT AND WIRE ELECTRICAL MOTORS AND THEIR COMPONENTS--The student will be able to:

13.01 Identify and explain the functions of various types of motors and their components.
13.02 Troubleshoot, test, and analyze motors, using various methods.
13.03 Identify, troubleshoot, and wire various types of electric motors.
13.04 Reverse the rotation of a motor.

14.0 ASSIST IN THE INSTALLATION OF A RESIDENTIAL HEATING AND AIR-CONDITIONING SYSTEM AND DETERMINE START-UP PROCEDURES--The student will be able to:

14.01 Read and comply with dispatch orders.
14.02 Explain local codes and ordinances.
14.03 Select and use appropriate tools and safety practices to test equipment.
14.04 Determine the electrical requirements of equipment.
14.05 Assist in the installation of a heating and air-conditioning system to the manufacturer's installation and operation specifications, using a practical knowledge of duct fabrication methods.
14.06 Determine the proper charge in a residential air-conditioning unit and adjust superheat.
14.07 Determine the temperature drop across the evaporator.
14.08 Determine the temperature rise across the condenser.
14.09 Write a service report.
14.10 Apply good customer-relations skills.

15.0 DEMONSTRATE A WORKING KNOWLEDGE OF MECHANICAL HEATING AND AIR-CONDITIONING SYSTEM OPERATIONS AND OF START-UP AND CHECK-OUT PROCEDURES--The student will be able to:

15.01 Identify and explain:
a. air-to-air heat-pump systems
b. water-to-air heat-pump systems
c. water-to-water heat-pump systems
d. air-to-ground heat-pump systems (geothermal)
e. open-loop heat-pump systems
f. closed-loop heat-pump systems
15.02 Determine the start-up and check-out procedures recommended by different manufacturers.
15.03 Determine the electrical requirements of equipment.
15.04 Select and use appropriate tools, instruments, and test equipment, following safety precautions.
15.05 Determine the temperature drop across the outdoor coil on a heat pump.
15.06 Determine the temperature rise across the indoor coil on a heat pump.

15.07 Test for a proper refrigerant charge in a residential heat pump.
15.08 Apply good customer-relations skills.

16.0 SIZE HEATING, AIR-CONDITIONING, AND REFRIGERATION PIPING--The student will be able to:

16.01 Identify and explain various types of heating, air-conditioning, and refrigeration piping.
16.02 Calculate and size various types of heating, air-conditioning, and refrigeration piping for various tasks.
16.03 Explain pressure and temperature drops.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
Heating, A/C, and Refrigeration Mechanic - OES 85902654

17.0 DEMONSTRATE A PRACTICAL KNOWLEDGE OF SOLID-STATE ELECTRONICS AS USED IN HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEMS--The student will be able to:

17.01 Explain the basic principles and functions of direct digital control (DDC).
17.02 Explain basic solid-state circuits and boards.
17.03 Identify, test, and replace circuits and boards.
17.04 Identify and explain the functions of a building-management system.
17.05 Program a programmable thermostat.

18.0 UTILIZE AND OPERATE MECHANICAL REFRIGERATION SERVICING AND TESTING EQUIPMENT--The student will be able to:

18.01 Identify the effects of superheat and subcooling on a system.
18.02 Identify and explain the functions of servicing and testing equipment (such as vacuum pumps, micron gauges, EPA-approved equipment, leak detectors, and charging systems).
18.03 Operate a refrigerant recovery system.
18.04 Explain the standards for and ways to measure, test, maintain, and evacuate a mechanical heating, air-conditioning, and refrigeration system.
18.05 Evacuate the refrigerant system with various vacuum methods.
18.06 Demonstrate compliance with Environmental Protection Agency (EPA) rules and regulations and, if possible, take the EPA test.
18.07 Charge various air-conditioning and mechanical refrigeration systems by various methods.
18.08 Demonstrate the effects of superheat and subcooling on a system.

19.0 USE COMBUSTION-TYPE HEATING SERVICING AND TESTING EQUIPMENT--The student will be able to:

19.01 Explain combustion theory and the safety precautions for using combustion-type heating servicing and testing equipment.

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19.02 Install a combustion-type heating unit to the manufacturer's and code requirements.

19.03 Identify and explain the various types of combustion-type heating servicing and testing equipment (such as draft gauge, U-tube manometer, sling psychrometer, millivolt meter, and oil-furnace testing equipment).

19.04 Use the servicing and testing equipment.

19.05 Test, analyze, and troubleshoot combustion-type heating systems.

20.0 TROUBLESHOOT GAS VALVES AND REGULATORS AS USED IN HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEMS--The student will be able to:

20.01 Identify and discuss the safety and regulation issues and concerns.

20.02 Explain the operations of various types of gas valves and regulators (such as low-voltage, line-voltage, pneumatic, solenoid, and gas and pressure regulators).

20.03 Identify and size various types of gas valves and regulators.

20.04 Determine the application of gas valves and regulators.

20.05 Troubleshoot gas valves and regulators.

21.0 DETERMINE THE PROPERTIES OF AIR--The student will be able to:

21.01 Explain the principles of psychrometrics.

21.02 Identify and explain the components and uses of a psychrometric meter.

21.03 Identify indoor-air-quality concerns as related to psychrometrics.

21.04 Determine the properties of air, using a psychrometric chart.

21.05 Follow safety precautions.

21.06 Identify and explain the different types and benefits of
- a. air-filtration systems
- b. air-handling systems
- c. ventilation systems

21.07 Fabricate, operate, maintain, and troubleshoot
- a. air-filtration systems
- b. air-handling systems
- c. ventilation systems

22.0 USE A PRESSURE ENTHALPY CHART TO DIAGRAM REFRIGERANT CYCLES--The student will be able to:

22.01 Identify all components of the pressure enthalpy chart.

22.02 Define "enthalpy" and "entropy."

22.03 Diagram several refrigerant cycles, using the pressure enthalpy chart.

23.0 EXPLAIN THE STANDARDS FOR AND WAYS TO MEASURE INDOOR-AIR QUALITY--The student will be able to:

23.01 Define indoor-air quality.

23.02 Identify and explain the codes and standards regarding indoor-air quality.

23.03 Select and use indoor-air-quality measuring devices.
23.04 Explain the standards for and ways to measure indoor-air quality, using various methods.

24.0 DEMONSTRATE THE INSTALLATION, MAINTENANCE, AND REPAIR OF HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEMS--The student will be able to:

24.01 Follow safety precautions.
24.02 Describe new technologies in heating, air-conditioning, and refrigeration installation, including
a. variable-speed motors
b. heat-pipe systems
c. desiccant systems
d. gas-driven heating systems
24.03 Apply local and national codes.
24.04 Lay out, construct, and troubleshoot comfort systems.
24.05 Test and analyze systems.
24.06 Test and analyze heat-recovery systems.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8713010
Course Title: Introduction to Heating, A/C, and Refrigeration Technology 1
Course Credit: 1

COURSE DESCRIPTION:

This course was developed as part of a core and is designed to develop competencies in safety, history, tools, and tool accessories as they pertain to the heating, air-conditioning, and refrigeration industry. There is no occupational completion point associated with the completion of this course.

01.0 IDENTIFY SAFE WORKING CONDITIONS AND FOLLOW SAFETY PRACTICES--The student will be able to:

- 01.01 Identify and use good housekeeping practices in the laboratory.
- 01.02 Explain the reasons for regular safety meetings and for company safety policies.
- 01.03 Explain the need for employee-background checks and medical examinations.
- 01.04 Identify and use appropriate fire extinguishers and other such safety devices.
- 01.05 Identify and follow emergency and rescue procedures.
- 01.06 Identify and use safe-handling practices as they relate to hazardous and volatile fluids, compounds, and gases.
- 01.07 Apply specific safety and recovery practices for refrigerants used in the industry.
- 01.08 Apply specific safety practices as they relate to handling and storing cylinders and materials.
- 01.09 Select and wear proper protective clothing and equipment.
- 01.10 Identify and use specific safety practices when using soldering and brazing skills.
- 01.11 Identify and use Occupational Safety and Health Administration (OSHA) practices when working with heating, air-conditioning, and refrigeration systems and equipment.
- 01.12 Follow safety precautions when using hand and power tools.
- 01.13 Demonstrate an understanding of cardiopulmonary resuscitation (CPR) and first aid.

02.0 DESCRIBE THE HISTORY AND CONCEPTS OF HEATING, AIR-CONDITIONING, AND REFRIGERATION--The student will be able to:

- 02.01 Identify and explain the four major refrigeration components.
- 02.02 Identify and explain the characteristics of a compression-cycle refrigerant system.
- 02.03 Differentiate between air conditioning and refrigeration.
- 02.04 Differentiate between split systems and package systems.
- 02.05 Describe the benefits of conditioned air and environments.

02.06 Discuss the impact of heating, air conditioning, and refrigeration on society.

02.07 Discuss current issues and concerns (such as indoor-air quality, the ozone layer, and computer technology) in the heating, air-conditioning, and refrigeration industry and in the environment and explain their future ramifications.

02.08 Describe the purpose and requirements of local, state, and federal heating, air-conditioning, and refrigeration codes and standards and of the manufacturer's installation instructions.

02.09 Identify various professional organizations, associations, and societies, and explain their purposes.

03.0 IDENTIFY, USE, AND MAINTAIN THE TOOLS AND TOOL ACCESSORIES USED IN THE HEATING, AIR-CONDITIONING, AND REFRIGERATION INDUSTRY--The student will be able to:

03.01 Identify and use
- a. basic hand tools and tool accessories
- b. power tools (electric, mechanical, and pneumatic, if available)
- c. pipe and tube-working tools of the trade
- d. specialized tools of the trade

03.02 Apply appropriate care and maintenance procedures for tools and tool accessories, following the directions in the tool-equipment manufacturer's manual.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8713020
Course Title: Introduction to Heating, A/C, and Refrigeration Technology 2
Course Credit: 1

COURSE DESCRIPTION:

This course was developed as part of a core and is designed to develop competencies in the areas of fluids, pressures, refrigerants, related codes, matter and heat behavior, and fabricating and servicing piping, tubings, and fittings in the heating, air-conditioning, and refrigeration industry. There is no occupational completion point associated with the completion of this course.

04.0 DEMONSTRATE AN UNDERSTANDING OF MATTER AND HEAT BEHAVIOR--The student will be able to:

04.01 Describe and explain freezing point, critical temperature, and absolute zero.
04.02 Describe matter, heat, and heat transfer.
04.03 Differentiate between heat and temperature.
04.04 Explain and distinguish among the characteristics of the three states of matter.
04.05 Explain the relationship between temperature and humidity.
04.06 Differentiate between latent heat and sensible heat.

05.0 DEMONSTRATE A WORKING KNOWLEDGE OF FLUIDS, PRESSURES, REFRIGERANTS, AND RELATED CODES--The student will be able to:

05.01 Identify the refrigeration cycle.
05.02 Identify and explain general safety issues and EPA rules and regulations regarding the handling of refrigerants.
05.03 Define and explain "pressure," "fluid," and "temperature."
05.04 Explain the standards for and ways to measure and calculate absolute and gauge pressures.
05.05 Identify and explain the classifications, properties, and uses of different refrigerants.
05.06 Explain how fluids react and flow in a closed versus an open environment or vessel.
05.07 Define and identify "color-coding" of refrigerant cylinders.
05.08 Compare pressure and temperature (P/T) charts.
05.09 Explain the proper methods of transferring, storing, and recovering refrigerants.
05.10 Explain the effects of an improper refrigerant and contaminants in a system.

06.0 FABRICATE AND SERVICE THE PIPING, TUBING, AND FITTINGS USED IN THE HEATING, AIR-CONDITIONING, AND REFRIGERATION INDUSTRY--The student will be able to:

06.01 Identify and explain the purpose of the piping, tubing, and fittings used in the heating, air-conditioning, and refrigeration industry.

06.02 Bend tubing, using tube benders.

06.03 Connect tubing, using
a. flared fittings
b. compression fittings

06.04 Connect tubing, using solderless connectors.

06.05 Connect tubing, using a swaged-joint connection.

06.06 Identify and use various types of torches.

06.07 Identify, select, and use appropriate soldering and brazing alloys, materials, and skills.

06.08 Explain the purposes and procedures for protecting piping materials and fabrication, such as valves, fittings, and products, from heat.

06.09 Solder and/or braze tubing, including aluminum.

06.10 Silver-braze brass, steel, and copper.

06.11 Demonstrate an understanding of the procedures for installing pipe and tubing insulation.

06.12 Explain the procedures required for installing heating, air-conditioning, refrigerant, and ventilation accessories.

06.13 Fabricate and leak-test the piping, tubing, and fittings used in the heating, air-conditioning, and refrigeration industry.

06.14 Maintain project time and materials lists.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8713030
Course Title: Introduction to Heating, A/C, and Refrigeration Technology 3
Course Credit: 1

COURSE DESCRIPTION:

This course was developed as part of a core and is designed to develop competencies in the areas of system components and accessories, communication and computer skills, entrepreneurship, and employability skills in the heating, air-conditioning, and refrigeration industry. Completion of this course prepares the student for:

OCCUPATIONAL COMPLETION POINT - DATA CODE A, HEATING, A/C, and Refrigeration Helper--Industry Title.

07.0 DEMONSTRATE A WORKING KNOWLEDGE OF HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEM COMPONENTS AND ACCESSORIES--The student will be able to:

07.01 Explain the types, operation, use, and maintenance requirements of
- a. compressors (such as reciprocating, rotary, screw, and scroll)
- b. condensers and evaporators (such as evaporative condensers and evaporative coils, shell and tube, tube within a tube, and fin and tube)
- c. metering devices (such as adjusting automatic and thermostatic expansion valves, fixed orifices, and other devices available on the local market)

07.02 Evaluate metering-device performance.
07.03 Explain the methods of compression, lubrication, and compressor loading and unloading.
07.04 Analyze the operating condition of a compressor.
07.05 Test, troubleshoot, and correct the causes of mechanical problems in a heating, air-conditioning, and refrigeration system.
07.06 Identify the location and explain the uses of refrigerant flow accessories.
07.07 Identify the location and explain the uses of heating, air-conditioning, and refrigeration-system accessories (such as receivers, dryers/filers, solenoid valves, heat exchangers, accumulators, suction filter, oil separators, evaporator pressure-regulating valve, crankcase pressure-regulating valves, and check valves).
07.08 Evaluate system performance.

08.0 APPLY APPROPRIATE COMMUNICATION AND COMPUTER SKILLS--The student will be able to:

08.01 Ask and answer questions coherently and concisely.
08.02 Read and follow written instructions and listen to and follow oral instructions.
08.03 Make oral presentations.
08.04 Write reports, using a word-processing software.
08.05 Read and interpret industry-related materials.
08.06 Find information in technical literature, such as a manufacturer's manual.
08.07 Interpret graphs, charts, diagrams, and tables commonly used in the industry.
08.08 Fill out the forms and invoices commonly used in the industry.
08.09 Demonstrate appropriate telephone communications skills.
08.10 Use industry-related computer software.

09.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

09.01 Define "entrepreneurship."
09.02 Explain the importance of entrepreneurship to the United States economy.
09.03 Discuss the advantages and disadvantages of business ownership.
09.04 Explain the risks involved in the ownership of a business.
09.05 Identify the personal characteristics of a successful entrepreneur.
09.06 Identify the business skills needed to operate a small business efficiently and effectively.
09.07 Describe the employer's responsibilities to support the business and industry.
09.08 Demonstrate a working knowledge of state and local licensing requirements.

10.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

10.01 Conduct a job search and identify advanced-training opportunities and their requirements.
10.02 Calculate the employer's investment cost for an employee.
10.03 Secure information about a job, including employee benefits.
10.04 Write a resume.
10.05 Evaluate a job offer, considering various factors such as career advancement, job satisfaction, employee benefits, etc.
10.06 Demonstrate ethical and responsible practices.
10.07 Exhibit pride in the quality of work performed.
10.08 Describe the advantages of a good driving record and the ramifications of a poor driving record on employability opportunities.
10.09 Explain the Florida "Right-to-Know" law that describes the Material Safety Data Sheet (MSDS).
10.10 Explain the importance of confidentiality in the workplace.
10.11 Discuss the effects of positive human-relation skills on success in the business.

10.12 Demonstrate appropriate responses to performance evaluations from the employer, the supervisor, and other persons in the workplace.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8713040
Course Title: Introduction to Heating, A/C, and Refrigeration Technology 4
Course Credit: 1

COURSE DESCRIPTION:

This course was developed as part of a core and is designed to develop competencies in the areas of electricity and electrical components and control systems in the heating, air-conditioning, and refrigeration industry. There is no occupational completion point associated with the completion of this course.

11.0 DEMONSTRATE A PRACTICAL KNOWLEDGE OF BASIC ELECTRICITY AND OF THE ELECTRICAL COMPONENTS OF HEATING, AIR-CONDITIONING, AND REFRIGERATION EQUIPMENT--The student will be able to:

11.01 Explain the principles of electricity.
11.02 Explain single- and three-phase power distribution.
11.03 Define and explain watts, ohms, volts, and amps.
11.04 Identify and explain electrical measuring tools and devices.
11.05 Explain the standards for and ways to measure watts, resistance, voltage, and amperage, using appropriate instruments or devices.
11.06 Identify and explain appropriate electrical wiring symbols.
11.07 Draw and explain a wiring schematic diagram for a control system.
11.08 Create a wiring schematic for each of the following, using all components and symbols for safe and effective operation and interpretation:
a. an air-conditioner
b. an electric furnace
c. a heat pump
d. an oil furnace
e. a gas furnace
11.09 Explain codes and standards and safety requirements for working with the electrical components used in heating, air conditioning, and refrigeration.
11.10 Troubleshoot protection devices, such as fuses and breakers.
11.11 Interpret tables and charts from the National Electrical Codes (NEC).

12.0 TROUBLESHOOT HEATING, AIR-CONDITIONING, AND REFRIGERATION ELECTRICAL CONTROL SYSTEMS AND THEIR COMPONENTS--The student will be able to:

12.01 Identify and explain the operations of electrical control systems and their components (such as heat anticipators, heat and cool thermostats, outdoor thermostats/low ambient controls, defrost controls/timers, and auxiliary heating controls).

12.02 Identify, install, and troubleshoot controls for heating, air-conditioning, and refrigeration systems.

12.03 Explain the operation of different types of electromechanical thermostats.

12.04 Wire basic heating, air-conditioning, and refrigeration systems.

12.05 Troubleshoot operational problems for different types of electromechanical thermostats.

12.06 Explain the electrical and mechanical operations of the basic heat pump.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8713050
Course Title: Introduction to Heating, A/C, and Refrigeration Technology 5
Course Credit: 1

COURSE DESCRIPTION:

This course was developed as part of a core and is designed to develop competencies in the areas of installing residential heating and air-conditioning systems and determining start-up procedures. There is no occupational completion point associated with the completion of this course.

13.0 TROUBLESHOOT AND WIRE ELECTRICAL MOTORS AND THEIR COMPONENTS--The student will be able to:

- 13.01 Identify and explain the functions of various types of motors and their components.
- 13.02 Troubleshoot, test, and analyze motors, using various methods.
- 13.03 Identify, troubleshoot, and wire various types of electric motors.
- 13.04 Reverse the rotation of a motor.

14.0 ASSIST IN THE INSTALLATION OF A RESIDENTIAL HEATING AND AIR-CONDITIONING SYSTEM AND DETERMINE START-UP PROCEDURES--The student will be able to:

- 14.01 Read and comply with dispatch orders.
- 14.02 Explain local codes and ordinances.
- 14.03 Select and use appropriate tools and safety practices to test equipment.
- 14.04 Determine the electrical requirements of equipment.
- 14.05 Assist in the installation of a heating and air-conditioning system to the manufacturer's installation and operation specifications, using a practical knowledge of duct fabrication methods.
- 14.06 Determine the proper charge in a residential air-conditioning unit and adjust superheat.
- 14.07 Determine the temperature drop across the evaporator.
- 14.08 Determine the temperature rise across the condenser.
- 14.09 Write a service report.
- 14.10 Apply good customer-relations skills.

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STUDENT PERFORMANCE STANDARDS

Course Number: 8713060
Course Title: Introduction to Heating, A/C, and Refrigeration Technology 6
Course Credit: 1

COURSE DESCRIPTION:

This course was developed as part of a core and is designed to develop competencies in heating and air-conditioning system operations and start-up and check-out procedures and in the use of refrigeration piping. Completion of this course prepares the student for:

OCCUPATIONAL COMPLETION POINT - DATA CODE B, Heating, A/C, and Refrigeration Mechanic Assistant--Industry Title.

15.0 DEMONSTRATE A WORKING KNOWLEDGE OF MECHANICAL HEATING AND AIR-CONDITIONING SYSTEM OPERATIONS AND OF START-UP AND CHECK-OUT PROCEDURES--The student will be able to:

15.01 Identify and explain:
- a. air-to-air heat-pump systems
- b. water-to-air heat-pump systems
- c. water-to-water heat-pump systems
- d. air-to-ground heat-pump systems (geothermal)
- e. open-loop heat-pump systems
- f. closed-loop heat-pump systems

15.02 Determine the start-up and check-out procedures recommended by different manufacturers.
15.03 Determine the electrical requirements of equipment.
15.04 Select and use appropriate tools, instruments, and test equipment, following safety precautions.
15.05 Determine the temperature drop across the outdoor coil on a heat pump.
15.06 Determine the temperature rise across the indoor coil on a heat pump.
15.07 Test for a proper refrigerant charge in a residential heat pump.
15.08 Apply good customer-relations skills.

16.0 SIZE HEATING, AIR-CONDITIONING, AND REFRIGERATION PIPING--The student will be able to:

16.01 Identify and explain various types of heating, air-conditioning, and refrigeration piping.
16.02 Calculate and size various types of heating, air-conditioning, and refrigeration piping for various tasks.
16.03 Explain pressure and temperature drops.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8713070
Course Title: Intermediate Heating, A/C, and Refrigeration Technology 7
Course Credit: 1

COURSE DESCRIPTION:

This course was developed as part of a core and is designed to develop competencies in solid-state electronics in the heating, air-conditioning, and refrigeration industry. There is no occupational completion point associated with the completion of this course.

17.0 DEMONSTRATE A PRACTICAL KNOWLEDGE OF SOLID-STATE ELECTRONICS AS USED IN HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEMS--The student will be able to:

- 17.01 Explain the basic principles and functions of direct digital control (DDC).
- 17.02 Explain basic solid-state circuits and boards.
- 17.03 Identify, test, and replace circuits and boards.
- 17.04 Identify and explain the functions of a building-management system.
- 17.05 Program a programmable thermostat.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8713080
Course Title: Intermediate Heating, A/C, and Refrigeration Technology 8
Course Credit: 1

COURSE DESCRIPTION:

This course was developed as part of a core and is designed to develop competencies in the areas of mechanical refrigeration servicing and testing, combustion-type heating servicing and testing, and troubleshooting gas valves and regulators in the heating, air-conditioning, and refrigeration industry. There is no occupational completion point associated with the completion of this course.

18.0 UTILIZE AND OPERATE MECHANICAL REFRIGERATION SERVICING AND TESTING EQUIPMENT--The student will be able to:

- 18.01 Identify the effects of superheat and subcooling on a system.
- 18.02 Identify and explain the functions of servicing and testing equipment (such as vacuum pumps, micron gauges, EPA-approved equipment, leak detectors, and charging systems).
- 18.03 Operate a refrigerant recovery system.
- 18.04 Explain the standards for and ways to measure, test, maintain, and evacuate a mechanical heating, air-conditioning, and refrigeration system.
- 18.05 Evacuate the refrigerant system with various vacuum methods.
- 18.06 Demonstrate compliance with Environmental Protection Agency (EPA) rules and regulations and, if possible, take the EPA test.
- 18.07 Charge various air-conditioning and mechanical refrigeration systems by various methods.
- 18.08 Demonstrate the effects of superheat and subcooling on a system.

19.0 USE COMBUSTION-TYPE HEATING SERVICING AND TESTING EQUIPMENT--The student will be able to:

- 19.01 Explain combustion theory and the safety precautions for using combustion-type heating servicing and testing equipment.
- 19.02 Install a combustion-type heating unit to the manufacturer's and code requirements.
- 19.03 Identify and explain the various types of combustion-type heating servicing and testing equipment (such as draft gauge, U-tube manometer, sling psychrometer, millivolt meter, and oil-furnace testing equipment).
- 19.04 Use the servicing and testing equipment.
- 19.05 Test, analyze, and troubleshoot combustion-type heating systems.

20.0 TROUBLESHOOT GAS VALVES AND REGULATORS AS USED IN HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEMS--The student will be able to:

20.01 Identify and discuss the safety and regulation issues and concerns.
20.02 Explain the operations of various types of gas valves and regulators (such as low-voltage, line-voltage, pneumatic, solenoid, and gas and pressure regulators).
20.03 Identify and size various types of gas valves and regulators.
20.04 Determine the application of gas valves and regulators.
20.05 Troubleshoot gas valves and regulators.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8713090
Course Title: Intermediate Heating, A/C, and Refrigeration Technology 9
Course Credit: 1

COURSE DESCRIPTION:

This course was developed as part of a core and is designed to develop competencies in areas related to the properties of air, psychrometric charts, pressure enthalpy charts, indoor-air quality, and the installation, maintenance, and repair of heating, air-conditioning, and refrigeration systems. Completion of this course prepares the student for:

OCCUPATIONAL COMPLETION POINT - DATA CODE C, HEATING, A/C, AND REFRIGERATION MECHANIC--OES 85902654.

21.0 DETERMINE THE PROPERTIES OF AIR--The student will be able to:

- 21.01 Explain the principles of psychrometrics.
- 21.02 Identify and explain the components and uses of a psychrometric meter.
- 21.03 Identify indoor-air-quality concerns as related to psychrometrics.
- 21.04 Determine the properties of air, using a psychrometric chart.
- 21.05 Follow safety precautions.
- 21.06 Identify and explain the different types and benefits of
  - a. air-filtration systems
  - b. air-handling systems
  - c. ventilation systems
- 21.07 Fabricate, operate, maintain, and troubleshoot
  - a. air-filtration systems
  - b. air-handling systems
  - c. ventilation systems

22.0 USE A PRESSURE ENTHALPY CHART TO DIAGRAM REFRIGERANT CYCLES--The student will be able to:

- 22.01 Identify all components of the pressure enthalpy chart.
- 22.02 Define "enthalpy" and "entropy."
- 22.03 Diagram several refrigerant cycles, using the pressure enthalpy chart.

23.0 EXPLAIN THE STANDARDS FOR AND WAYS TO MEASURE INDOOR-AIR QUALITY--The student will be able to:

- 23.01 Define indoor-air quality.
- 23.02 Identify and explain the codes and standards regarding indoor-air quality.
- 23.03 Select and use indoor-air-quality measuring devices.

23.04 Explain the standards for and ways to measure indoor-air quality, using various methods.

24.0 DEMONSTRATE THE INSTALLATION, MAINTENANCE, AND REPAIR OF HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEMS--The student will be able to:

24.01 Follow safety precautions.
24.02 Describe new technologies in heating, air-conditioning, and refrigeration installation, including
- a. variable-speed motors
- b. heat-pipe systems
- c. desiccant systems
- d. gas-driven heating systems

24.03 Apply local and national codes.
24.04 Lay out, construct, and troubleshoot comfort systems.
24.05 Test and analyze systems.
24.06 Test and analyze heat-recovery systems.

Florida Department of Education
INTENDED OUTCOMES

Program Title: COMMERCIAL REFRIGERTION TECHNOLOGY

	PSAV
Program Number:	**I470202**
CIP Number:	0647.020202
Grade Level	30, 31
Length:	1,800 Hours
Certification:	AC HEAT ME @7 G
	REFRG MECH @7 G
Basic-Skills Grade Level	
Math	10
Language	9
Reading	9

INTENDED OUTCOMES: After successfully completing appropriate content for each occupational completion poin of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Heating, A/C, and Refrigeration Helper - Industry Title

01.0 Identify safe working conditions and follow safety practices.
02.0 Describe the history and concepts of heating, air conditioning, and refrigeration.
03.0 Identify, use, and maintain the hand tools and tool accessories used in the heating, air-conditioning, and refrigeration industry.
04.0 Demonstrate an understanding of matter and heat behavior.
05.0 Demonstrate a working knowledge of fluids, pressures, refrigerants, and related codes.
06.0 Fabricate and service the piping, tubing, and fittings used in the heating, air-conditioning, and refrigeration industry.
07.0 Demonstrate a working knowledge of heating, air-conditioning, and refrigeration system components and accessories.
08.0 Apply appropriate communication and computer skills.
09.0 Demonstrate an understanding of entrepreneurship.
10.0 Demonstrate employability skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Heating, A/C, and Refrigeration Mechanic Assistant - Industry Title

11.0 Demonstrate a practical knowledge of basic electricity and of the electrical components of heating, air-conditioning, and refrigeration equipment.
12.0 Troubleshoot heating, air-conditioning, and refrigeration electrical control systems and their components.
13.0 Troubleshoot and wire electrical motors and their components.
14.0 Assist in the installation of a residential heating and air-conditioning system and determine start-up procedures.

15.0 Demonstrate a working knowledge of mechanical heating and air-conditioning system operations and of start-up and check-out procedures.
16.0 Size heating, air-conditioning, and refrigeration piping.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
Heating, A/C, and Refrigeration Mechanic - OES 85902654

17.0 Demonstrate a practical knowledge of solid-state electronics as used in heating, air-conditioning, and refrigeration systems.
18.0 Utilize and operate mechanical refrigeration servicing and testing equipment.
19.0 Use combustion-type heating servicing and testing equipment.
20.0 Troubleshoot gas valves and regulators as used in heating, air-conditioning, and refrigeration systems.
21.0 Determine the properties of air.
22.0 Use a pressure enthalpy chart to diagram refrigerant cycles.
23.0 Explain the standards for and ways to measure indoor-air quality.
24.0 Demonstrate the installation, maintenance, and repair of heating, air-conditioning, and refrigeration systems.

OCCUPATIONAL COMPLETION POINT - DATA CODE D
Refrigeration Mechanic - DOT 637.261-026

25.0 Demonstrate the installation, maintenance, and repair of commercial refrigeration systems.
26.0 Demonstrate a working knowledge of refrigeration-system vibration and insulation.
27.0 Apply commercial refrigeration-pipe sizing and troubleshooting procedures.
28.0 Use refrigeration-systems skills in commercial applications.
29.0 Demonstrate a working knowledge of refrigerated storage systems.
30.0 Diagnose, maintain, and repair ice-making systems.
31.0 Use refrigeration electrical-system skills in commercial applications.
32.0 Maintain and troubleshoot commercial refrigeration systems.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Commercial Refrigeration Technology
Postsecondary Number: I470202

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Heating, A/C, and Refrigeration Helper - Industry Title

01.0 IDENTIFY SAFE WORKING CONDITIONS AND FOLLOW SAFETY PRACTICES--The student will be able to:

- 01.01 Identify and use good housekeeping practices in the laboratory.
- 01.02 Explain the reasons for regular safety meetings and for company safety policies.
- 01.03 Explain the need for employee-background checks and medical examinations.
- 01.04 Identify and use appropriate fire extinguishers and other such safety devices.
- 01.05 Identify and follow emergency and rescue procedures.
- 01.06 Identify and use safe-handling practices as they relate to hazardous and volatile fluids, compounds, and gases.
- 01.07 Apply specific safety and recovery practices for refrigerants used in the industry.
- 01.08 Apply specific safety practices as they relate to handling and storing cylinders and materials.
- 01.09 Select and wear proper protective clothing and equipment.
- 01.10 Identify and use specific safety practices when using soldering and brazing skills.
- 01.11 Identify and use Occupational Safety and Health Administration (OSHA) practices when working with heating, air-conditioning, and refrigeration systems and equipment.
- 01.12 Follow safety precautions when using hand and power tools.
- 01.13 Demonstrate an understanding of cardiopulmonary resuscitation (CPR) and first aid.

02.0 DESCRIBE THE HISTORY AND CONCEPTS OF HEATING, AIR-CONDITIONING, AND REFRIGERATION--The student will be able to:

- 02.01 Identify and explain the four major refrigeration components.
- 02.02 Identify and explain the characteristics of a compression-cycle refrigerant system.
- 02.03 Differentiate between air conditioning and refrigeration.
- 02.04 Differentiate between split systems and package systems.
- 02.05 Describe the benefits of conditioned air and environments.
- 02.06 Discuss the impact of heating, air conditioning, and refrigeration on society.

02.07 Discuss current issues and concerns (such as indoor-air quality, the ozone layer, and computer technology) in the heating, air-conditioning, and refrigeration industry and in the environment and explain their future ramifications.

02.08 Describe the purpose and requirements of local, state, and federal heating, air-conditioning, and refrigeration codes and standards and of the manufacturer's installation instructions.

02.09 Identify various professional organizations, associations, and societies, and explain their purposes.

03.0 IDENTIFY, USE, AND MAINTAIN THE TOOLS AND TOOL ACCESSORIES USED IN THE HEATING, AIR-CONDITIONING, AND REFRIGERATION INDUSTRY--The student will be able to:

03.01 Identify and use
- a. basic hand tools and tool accessories
- b. power tools (electric, mechanical, and pneumatic, if available)
- c. pipe and tube-working tools of the trade
- d. specialized tools of the trade

03.02 Apply appropriate care and maintenance procedures for tools and tool accessories, following the directions in the tool-equipment manufacturer's manual.

04.0 DEMONSTRATE AN UNDERSTANDING OF MATTER AND HEAT BEHAVIOR--The student will be able to:

04.01 Describe and explain freezing point, critical temperature, and absolute zero.

04.02 Describe matter, heat, and heat transfer.

04.03 Differentiate between heat and temperature.

04.04 Explain and distinguish among the characteristics of the three states of matter.

04.05 Explain the relationship between temperature and humidity.

04.06 Differentiate between latent heat and sensible heat.

05.0 DEMONSTRATE A WORKING KNOWLEDGE OF FLUIDS, PRESSURES, REFRIGERANTS, AND RELATED CODES--The student will be able to:

05.01 Identify the refrigeration cycle.

05.02 Identify and explain general safety issues and EPA rules and regulations regarding the handling of refrigerants.

05.03 Define and explain "pressure," "fluid," and "temperature."

05.04 Explain the standards for and ways to measure and calculate absolute and gauge pressures.

05.05 Identify and explain the classifications, properties, and uses of different refrigerants.

05.06 Explain how fluids react and flow in a closed versus an open environment or vessel.

05.07 Define and identify "color-coding" of refrigerant cylinders.
05.08 Compare pressure and temperature (P/T) charts.
05.09 Explain the proper methods of transferring, storing, and recovering refrigerants.
05.10 Explain the effects of an improper refrigerant and contaminants in a system.

06.0 FABRICATE AND SERVICE THE PIPING, TUBING, AND FITTINGS USED IN THE HEATING, AIR-CONDITIONING, AND REFRIGERATION INDUSTRY--The student will be able to:

06.01 Identify and explain the purpose of the piping, tubing, and fittings used in the heating, air-conditioning, and refrigeration industry.
06.02 Bend tubing, using tube benders.
06.03 Connect tubing, using
a. flared fittings
b. compression fittings
06.04 Connect tubing, using solderless connectors.
06.05 Connect tubing, using a swaged-joint connection.
06.06 Identify and use various types of torches.
06.07 Identify, select, and use appropriate soldering and brazing alloys, materials, and skills.
06.08 Explain the purposes and procedures for protecting piping materials and fabrication, such as valves, fittings, and products, from heat.
06.09 Solder and/or braze tubing, including aluminum.
06.10 Silver-braze brass, steel, and copper.
06.11 Demonstrate an understanding of the procedures for installing pipe and tubing insulation.
06.12 Explain the procedures required for installing heating, air-conditioning, refrigerant, and ventilation accessories.
06.13 Fabricate and leak-test the piping, tubing, and fittings used in the heating, air-conditioning, and refrigeration industry.
06.14 Maintain project time and materials lists.

07.0 DEMONSTRATE A WORKING KNOWLEDGE OF HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEM COMPONENTS AND ACCESSORIES--The student will be able to:

07.01 Explain the types, operation, use, and maintenance requirements of
a. compressors (such as reciprocating, rotary, screw, and scroll)
b. condensers and evaporators (such as evaporative condensers, evaporative coils, shell and tube, tube within a tube, and fin and tube)
c. metering devices (such as adjusting automatic and thermostatic expansion valves, fixed orifices, and other devices available on the local market)
07.02 Evaluate metering-device performance.

07.03 Explain the methods of compression, lubrication, and compressor loading and unloading.
07.04 Analyze the operating condition of a compressor.
07.05 Test, troubleshoot, and correct the causes of mechanical problems in a heating, air-conditioning, and refrigeration system.
07.06 Identify the location and explain the uses of refrigerant flow accessories.
07.07 Identify the location and explain the uses of heating, air-conditioning, and refrigeration-system accessories (such as receivers, dryers/filers, solenoid valves, heat exchangers, accumulators, suction filter, oil separators, evaporator pressure-regulating valve, crankcase pressure-regulating valves, and check valves).
07.08 Evaluate system performance.

08.0 APPLY APPROPRIATE COMMUNICATION AND COMPUTER SKILLS--The student will be able to:

08.01 Ask and answer questions coherently and concisely.
08.02 Read and follow written instructions and listen to and follow oral instructions.
08.03 Make oral presentations.
08.04 Write reports, using a word-processing software.
08.05 Read and interpret industry-related materials.
08.06 Find information in technical literature, such as a manufacturer's manual.
08.07 Interpret graphs, charts, diagrams, and tables commonly used in the industry.
08.08 Fill out the forms and invoices commonly used in the industry.
08.09 Demonstrate appropriate telephone communications skills.
08.10 Use industry-related computer software.

09.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

09.01 Define "entrepreneurship."
09.02 Explain the importance of entrepreneurship to the United States economy.
09.03 Discuss the advantages and disadvantages of business ownership.
09.04 Explain the risks involved in the ownership of a business.
09.05 Identify the personal characteristics of a successful entrepreneur.
09.06 Identify the business skills needed to operate a small business efficiently and effectively.
09.07 Describe the employer's responsibilities to support the business and industry.
09.08 Demonstrate a working knowledge of state and local licensing requirements.

10.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

10.01 Conduct a job search and identify advanced-training opportunities and their requirements.
10.02 Calculate the employer's investment cost for an employee.
10.03 Secure information about a job, including employee benefits.
10.04 Write a resume.
10.05 Evaluate a job offer, considering various factors such as career advancement, job satisfaction, employee benefits, etc.
10.06 Demonstrate ethical and responsible practices.
10.07 Exhibit pride in the quality of work performed.
10.08 Describe the advantages of a good driving record and the ramifications of a poor driving record on employability opportunities.
10.09 Explain the Florida "Right-to-Know" law that describes the Material Safety Data Sheet (MSDS).
10.10 Explain the importance of confidentiality in the workplace.
10.11 Discuss the effects of positive human-relation skills on success in the business.
10.12 Demonstrate appropriate responses to performance evaluations from the employer, the supervisor, and other persons in the workplace.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Heating, A/C, and Refrigeration Mechanic Assistant - Industry Title

11.0 DEMONSTRATE A PRACTICAL KNOWLEDGE OF BASIC ELECTRICITY AND OF THE ELECTRICAL COMPONENTS OF HEATING, AIR-CONDITIONING, AND REFRIGERATION EQUIPMENT--The student will be able to:

11.01 Explain the principles of electricity.
11.02 Explain single- and three-phase power distribution.
11.03 Define and explain watts, ohms, volts, and amps.
11.04 Identify and explain electrical measuring tools and devices.
11.05 Explain the standards for and ways to measure watts, resistance, voltage, and amperage, using appropriate instruments or devices.
11.06 Identify and explain appropriate electrical wiring symbols.
11.07 Draw and explain a wiring schematic diagram for a control system.
11.08 Create a wiring schematic for each of the following, using all components and symbols for safe and effective operation and interpretation:
a. an air-conditioner
b. an electric furnace
c. a heat pump
d. an oil furnace
e. a gas furnace

11.09 Explain codes and standards and safety requirements for working with the electrical components used in heating, air conditioning, and refrigeration.

11.10 Troubleshoot protection devices, such as fuses and breakers.

11.11 Interpret tables and charts from the National Electrical Codes (NEC).

12.0 TROUBLESHOOT HEATING, AIR-CONDITIONING, AND REFRIGERATION ELECTRICAL CONTROL SYSTEMS AND THEIR COMPONENTS--The student will be able to:

12.01 Identify and explain the operations of electrical control systems and their components (such as heat anticipators, heat and cool thermostats, outdoor thermostats/low ambient controls, defrost controls/timers, and auxiliary heating controls).

12.02 Identify, install, and troubleshoot controls for heating, air-conditioning, and refrigeration systems.

12.03 Explain the operation of different types of electromechanical thermostats.

12.04 Wire basic heating, air-conditioning, and refrigeration systems.

12.05 Troubleshoot operational problems for different types of electromechanical thermostats.

12.06 Explain the electrical and mechanical operations of the basic heat pump.

13.0 TROUBLESHOOT AND WIRE ELECTRICAL MOTORS AND THEIR COMPONENTS--The student will be able to:

13.01 Identify and explain the functions of various types of motors and their components.

13.02 Troubleshoot, test, and analyze motors, using various methods.

13.03 Identify, troubleshoot, and wire various types of electric motors.

13.04 Reverse the rotation of a motor.

14.0 ASSIST IN THE INSTALLATION OF A RESIDENTIAL HEATING AND AIR-CONDITIONING SYSTEM AND DETERMINE START-UP PROCEDURES--The student will be able to:

14.01 Read and comply with dispatch orders.

14.02 Explain local codes and ordinances.

14.03 Select and use appropriate tools and safety practices to test equipment.

14.04 Determine the electrical requirements of equipment.

14.05 Assist in the installation of a heating and air-conditioning system to the manufacturer's installation and operation specifications, using a practical knowledge of duct fabrication methods.

14.06 Determine the proper charge in a residential air-conditioning unit and adjust superheat.

14.07 Determine the temperature drop across the evaporator.
14.08 Determine the temperature rise across the condenser.
14.09 Write a service report.
14.10 Apply good customer-relations skills.

15.0 DEMONSTRATE A WORKING KNOWLEDGE OF MECHANICAL HEATING AND AIR-CONDITIONING SYSTEM OPERATIONS AND OF START-UP AND CHECK-OUT PROCEDURES--The student will be able to:

15.01 Identify and explain:
a. air-to-air heat-pump systems
b. water-to-air heat-pump systems
c. water-to-water heat-pump systems
d. air-to-ground heat-pump systems (geothermal)
e. open-loop heat-pump systems
f. closed-loop heat-pump systems
15.02 Determine the start-up and check-out procedures recommended by different manufacturers.
15.03 Determine the electrical requirements of equipment.
15.04 Select and use appropriate tools, instruments, and test equipment, following safety precautions.
15.05 Determine the temperature drop across the outdoor coil on a heat pump.
15.06 Determine the temperature rise across the indoor coil on a heat pump.
15.07 Test for a proper refrigerant charge in a residential heat pump.
15.08 Apply good customer-relations skills.

16.0 SIZE HEATING, AIR-CONDITIONING, AND REFRIGERATION PIPING--The student will be able to:

16.01 Identify and explain various types of heating, air-conditioning, and refrigeration piping.
16.02 Calculate and size various types of heating, air-conditioning, and refrigeration piping for various tasks.
16.03 Explain pressure and temperature drops.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
Heating, A/C, and Refrigeration Mechanic - OES 85902654

17.0 DEMONSTRATE A PRACTICAL KNOWLEDGE OF SOLID-STATE ELECTRONICS AS USED IN HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEMS--The student will be able to:

17.01 Explain the basic principles and functions of direct digital control (DDC).
17.02 Explain basic solid-state circuits and boards.
17.03 Identify, test, and replace circuits and boards.
17.04 Identify and explain the functions of a building-management system.
17.05 Program a programmable thermostat.

18.0 UTILIZE AND OPERATE MECHANICAL REFRIGERATION SERVICING AND TESTING EQUIPMENT--The student will be able to:

18.01 Identify the effects of superheat and subcooling on a system.
18.02 Identify and explain the functions of servicing and testing equipment (such as vacuum pumps, micron gauges, EPA-approved equipment, leak detectors, and charging systems).
18.03 Operate a refrigerant recovery system.
18.04 Explain the standards for and ways to measure, test, maintain, and evacuate a mechanical heating, air-conditioning, and refrigeration system.
18.05 Evacuate the refrigerant system with various vacuum methods.
18.06 Demonstrate compliance with Environmental Protection Agency (EPA) rules and regulations and, if possible, take the EPA test.
18.07 Charge various air-conditioning and mechanical refrigeration systems by various methods.
18.08 Demonstrate the effects of superheat and subcooling on a system.

19.0 USE COMBUSTION-TYPE HEATING SERVICING AND TESTING EQUIPMENT--The student will be able to:

19.01 Explain combustion theory and the safety precautions for using combustion-type heating servicing and testing equipment.
19.02 Install a combustion-type heating unit to the manufacturer's and code requirements.
19.03 Identify and explain the various types of combustion-type heating servicing and testing equipment (such as draft gauge, U-tube manometer, sling psychrometer, millivolt meter, and oil-furnace testing equipment).
19.04 Use the servicing and testing equipment.
19.05 Test, analyze, and troubleshoot combustion-type heating systems.

20.0 TROUBLESHOOT GAS VALVES AND REGULATORS AS USED IN HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEMS--The student will be able to:

20.01 Identify and discuss the safety and regulation issues and concerns.
20.02 Explain the operations of various types of gas valves and regulators (such as low-voltage, line-voltage, pneumatic, solenoid, and gas and pressure regulators).
20.03 Identify and size various types of gas valves and regulators.
20.04 Determine the application of gas valves and regulators.
20.05 Troubleshoot gas valves and regulators.

21.0 DETERMINE THE PROPERTIES OF AIR--The student will be able to:

21.01 Explain the principles of psychrometrics.
21.02 Identify and explain the components and uses of a psychrometric meter.
21.03 Identify indoor-air-quality concerns as related to psychrometrics.
21.04 Determine the properties of air, using a psychrometric chart.
21.05 Follow safety precautions.
21.06 Identify and explain the different types and benefits of
a. air-filtration systems
b. air-handling systems
c. ventilation systems
21.07 Fabricate, operate, maintain, and troubleshoot
a. air-filtration systems
b. air-handling systems
c. ventilation systems
21.08 Determine air properties by the use of a psychrometric chart.

22.0 USE A PRESSURE ENTHALPY CHART TO DIAGRAM REFRIGERANT CYCLES--The student will be able to:

22.01 Identify all components of the pressure enthalpy chart.
22.02 Define "enthalpy" and "entropy."
22.03 Diagram several refrigerant cycles, using the pressure enthalpy chart.

23.0 EXPLAIN THE STANDARDS FOR AND WAYS TO MEASURE INDOOR-AIR QUALITY--The student will be able to:

23.01 Define indoor-air quality.
23.02 Identify and explain the codes and standards regarding indoor-air quality.

23.03 Select and use indoor-air-quality measuring devices.
23.04 Explain the standards for and ways to measure indoor-air quality, using various methods.

24.0 DEMONSTRATE THE INSTALLATION, MAINTENANCE, AND REPAIR OF HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEMS--The student will be able to:

24.01 Follow safety precautions.
24.02 Describe new technologies in heating, air-conditioning, and refrigeration installation, including
a. variable-speed motors
b. heat-pipe systems
c. desiccant systems
d. gas-driven heating systems
24.03 Apply local and national codes.
24.04 Lay out, construct, and troubleshoot comfort systems.
24.05 Test and analyze systems.

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24.06 Test and analyze heat-recovery systems.

OCCUPATIONAL COMPLETION POINT - DATA CODE D
Refrigeration Mechanic - DOT 637.261-026

25.0 DEMONSTRATE THE INSTALLATION, MAINTENANCE, AND REPAIR OF COMMERCIAL REFRIGERATION SYSTEMS--The student will be able to:

25.01 Calculate loads, and design and lay out a commercial refrigeration system.
25.02 Identify and explain commercial refrigeration-pressure-regulation devices, controls, and components.
25.03 Install, service, and repair ice machines and specialty refrigeration systems.
25.04 Test and troubleshoot refrigerant-pressure-regulating devices, controls, and components.
25.05 Apply local and national codes and mechanical safety practices.

26.0 DEMONSTRATE A WORKING KNOWLEDGE OF REFRIGERATION-SYSTEM VIBRATION AND INSULATION--The student will be able to:

26.01 Describe the applications of vibration eliminators.
26.02 Identify and select the correct insulation for commercial application.

27.0 APPLY COMMERCIAL REFRIGERATION-PIPE SIZING AND TROUBLESHOOTING PROCEDURES--The student will be able to:

27.01 Determine the capacities of refrigerant lines, including the amounts they will hold, equivalent lengths of fittings, and the total effective length for various pipe lines.
27.02 Identify and apply industry-approved installation procedures.
27.03 Troubleshoot refrigeration-pipe-sizing problems.
a. Explain the use of traps in suction-line risers.
b. Explain pressure drop.
c. Calculate pressure drop in liquid-line risers.
d. Size double risers, hot-gas lines, and liquid lines from condenser to receiver.

28.0 USE REFRIGERATION-SYSTEMS SKILLS IN COMMERCIAL APPLICATIONS--The student will be able to:

28.01 Identify and apply the safety practices used with commercial refrigeration systems.
28.02 Apply refrigeration-systems skills to commercial refrigeration systems.
a. Perform dehydration, evacuation, and recovery procedures.
b. Interpret blueprints and mechanical drawings.
c. Service and charge a refrigeration system.
d. Test, analyze, and replace compressors.
e. Retrofit alternative refrigerants and oils.

29.0 DEMONSTRATE A WORKING KNOWLEDGE OF REFRIGERATED STORAGE SYSTEMS--The student will be able to:

29.01 Identify and differentiate among various types of cases, such as service cases and self-service cases.
29.02 Explain the operation of
a. air-screen freezers
b. glass-door freezers
c. coffin cases
d. walk-in coolers
29.03 Differentiate among medium-temperature, low-temperature, and ultralow-temperature systems.
29.04 Explain various defrost methods.
29.05 Maintain, test, and troubleshoot defrost components.
29.06 Identify and explain the components of various refrigerated storage systems.
29.07 Maintain, test, and troubleshoot various refrigerated storage system components.

30.0 DIAGNOSE, MAINTAIN, AND REPAIR ICE-MAKING SYSTEMS--The student will be able to:

30.01 Identify and explain various types and operations of ice-making systems.
30.02 Maintain, test, troubleshoot, and repair various types of ice-making systems, following the manufacturers' recommendations.
30.03 Identify and explain the different types of water-treatment methods and systems.
30.04 Analyze water to identify water problems and the proper treatments.

31.0 USE REFRIGERATION ELECTRICAL-SYSTEM SKILLS IN COMMERCIAL APPLICATIONS--The student will be able to:

31.01 Apply electrical safety practices for commercial refrigeration systems.
31.02 Apply refrigeration electrical-system skills to commercial refrigeration systems:
a. Interpret symbols of electrical components and diagrams.
b. Interpret schematics and diagrams.
c. Apply electrical theory and calculations.
d. Explain the principles of designing electrical systems.
e. Test and troubleshoot single- and three-phase motors.
31.03 Test the solid-state components used in commercial refrigeration systems.
31.04 Troubleshoot and diagnose the electrical circuits used in commercial refrigeration systems.
31.05 Test and troubleshoot the thermostatic controls used in commercial refrigeration systems.

32.0 MAINTAIN AND TROUBLESHOOT COMMERCIAL REFRIGERATION SYSTEMS--The student will be able to:

32.01 Follow appropriate safety precautions for commercial refrigeration systems.

32.02 Identify and explain the operations of various types of commercial refrigeration systems and applications, such as single, multiplex, and cascade systems.

32.03 Maintain and troubleshoot various types of commercial refrigeration systems.

Florida Department of Education
INTENDED OUTCOMES

Program Title: Commercial Heating and Air Conditioning Technology

	PSAV
Program Number:	**I470203**
CIP Number:	0647.020302
Grade Level:	30, 31
Length:	1,800 Hours
Certification:	AC HEAT ME @7 G
	REFRG MECH @7 G
Basic-Skills Grade Level	
Math	10
Language	9
Reading	9

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Heating, A/C, and Refrigeration Helper - Industry Title

01.0 Identify safe working conditions and follow safety practices.
02.0 Describe the history and concepts of heating, air-conditioning, and refrigeration.
03.0 Identify, use, and maintain the hand tools and tool accessories used in the heating, air-conditioning, and refrigeration industry.
04.0 Demonstrate an understanding of matter and heat behavior.
05.0 Demonstrate a working knowledge of fluids, pressures, refrigerants, and related codes.
06.0 Fabricate and service the piping, tubing, and fittings used in the heating, air-conditioning, and refrigeration industry.
07.0 Demonstrate a working knowledge of heating, air-conditioning, and refrigeration system components and accessories.
08.0 Apply appropriate communication and computer skills.
09.0 Demonstrate an understanding of entrepreneurship.
10.0 Demonstrate employability skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Heating, A/C, and Refrigeration Mechanic Assistant - Industry Title

11.0 Demonstrate a practical knowledge of basic electricity and of the electrical components of heating, air-conditioning, and refrigeration equipment.
12.0 Troubleshoot heating, air-conditioning, and refrigeration electrical control systems and their components.
13.0 Troubleshoot and wire electrical motors and their components.
14.0 Assist in the installation of a residential heating and air-conditioning system and determine start-up procedures.

5.0 Demonstrate a working knowledge of mechanical heating and air-conditioning system operations and of start-up and check-out procedures.
6.0 Size heating, air-conditioning, and refrigeration piping.

OCCUPATIONAL COMPLETION POINT - DATA CODE C Heating, A/C, and Refrigeration Mechanic - OES 85902654

17.0 Demonstrate a practical knowledge of solid-state electronics as used in heating, air-conditioning, and refrigeration systems.
18.0 Utilize and operate mechanical refrigeration servicing and testing equipment.
19.0 Use combustion-type heating servicing and testing equipment.
20.0 Troubleshoot gas valves and regulators as used in heating, air-conditioning, and refrigeration systems.
21.0 Determine the properties of air.
22.0 Use a pressure enthalpy chart to diagram refrigerant cycles.
23.0 Explain the standards for and ways to measure indoor-air quality.
24.0 Demonstrate the installation, maintenance, and repair of heating, air-conditioning, and refrigeration systems.

OCCUPATIONAL COMPLETION POINT - DATA CODE D
Heating, A/C and Refrigeration Technician - Industry Title

25.0 Test and size electrical generation and distribution components for commercial heating and air-conditioning systems.
26.0 Maintain, test, and troubleshoot electrical motors and their components for commercial heating and air-conditioning systems.
27.0 Demonstrate a working knowledge of engineered control systems as used in commercial heating and air-conditioning systems.
28.0 Maintain and troubleshoot pneumatic control systems for commercial heating and air-conditioning applications.
29.0 Troubleshoot electrical circuits as used in commercial heating and air-conditioning systems.
30.0 Select appropriate commercial compressors.
31.0 Test and adjust commercial evaporative condensers.
32.0 Maintain, test, and troubleshoot commercial evaporators.
33.0 Maintain, test, and adjust commercial heating and air-conditioning accessories.
34.0 Maintain, troubleshoot, and repair commercial heating systems.
35.0 Maintain and repair thermal storage systems.
36.0 Maintain, troubleshoot, and repair commercial heating and air-conditioning systems.
37.0 Calculate commercial heating and air-conditioning loads.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: **Commercial Heating and Air Conditioning Technology**
Postsecondary Number: I470203

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Heating, A/C, and Refrigeration Helper - Industry Title

01.0 IDENTIFY SAFE WORKING CONDITIONS AND FOLLOW SAFETY PRACTICES--The student will be able to:

- 01.01 Identify and use good housekeeping practices in the laboratory.
- 01.02 Explain the reasons for regular safety meetings and for company safety policies.
- 01.03 Explain the need for employee-background checks and medical examinations.
- 01.04 Identify and use appropriate fire extinguishers and other such safety devices.
- 01.05 Identify and follow emergency and rescue procedures.
- 01.06 Identify and use safe-handling practices as they relate to hazardous and volatile fluids, compounds, and gases.
- 01.07 Apply specific safety and recovery practices for refrigerants used in the industry.
- 01.08 Apply specific safety practices as they relate to handling and storing cylinders and materials.
- 01.09 Select and wear proper protective clothing and equipment.
- 01.10 Identify and use specific safety practices when using soldering and brazing skills.
- 01.11 Identify and use Occupational Safety and Health Administration (OSHA) practices when working with heating, air-conditioning, and refrigeration systems and equipment.
- 01.12 Follow safety precautions when using hand and power tools.
- 01.13 Demonstrate an understanding of cardiopulmonary resuscitation (CPR) and first aid.

02.0 DESCRIBE THE HISTORY AND CONCEPTS OF HEATING, AIR-CONDITIONING, AND REFRIGERATION--The student will be able to:

- 02.01 Identify and explain the four major refrigeration components.
- 02.02 Identify and explain the characteristics of a compression-cycle refrigerant system.
- 02.03 Differentiate between air-conditioning and refrigeration.
- 02.04 Differentiate between split systems and package systems.
- 02.05 Describe the benefits of conditioned air and environments.
- 02.06 Discuss the impact of heating, air-conditioning, and refrigeration on society.

02.07 Discuss current issues and concerns (such as indoor-air quality, the ozone layer, and computer technology) in the heating, air-conditioning, and refrigeration industry and in the environment and explain their future ramifications.

02.08 Describe the purpose and requirements of local, state, and federal heating, air-conditioning, and refrigeration codes and standards and of the manufacturer's installation instructions.

02.09 Identify various professional organizations, associations, and societies, and explain their purposes.

03.0 IDENTIFY, USE, AND MAINTAIN THE TOOLS AND TOOL ACCESSORIES USED IN THE HEATING, AIR-CONDITIONING, AND REFRIGERATION INDUSTRY--The student will be able to:

03.01 Identify and use
- a. basic hand tools and tool accessories
- b. power tools (electric, mechanical, and pneumatic, if available)
- c. pipe and tube-working tools of the trade
- d. specialized tools of the trade

03.02 Apply appropriate care and maintenance procedures for tools and tool accessories, following the directions in the tool-equipment manufacturer's manual.

04.0 DEMONSTRATE AN UNDERSTANDING OF MATTER AND HEAT BEHAVIOR--The student will be able to:

04.01 Describe and explain freezing point, critical temperature, and absolute zero.

04.02 Describe matter, heat, and heat transfer.

04.03 Differentiate between heat and temperature.

04.04 Explain and distinguish among the characteristics of the three states of matter.

04.05 Explain the relationship between temperature and humidity.

04.06 Differentiate between latent heat and sensible heat.

05.0 DEMONSTRATE A WORKING KNOWLEDGE OF FLUIDS, PRESSURES, REFRIGERANTS, AND RELATED CODES--The student will be able to:

05.01 Identify the refrigeration cycle.

05.02 Identify and explain general safety issues and EPA rules and regulations regarding the handling of refrigerants.

05.03 Define and explain "pressure," "fluid," and "temperature."

05.04 Explain the standards for and ways to measure and calculate absolute and gauge pressures.

05.05 Identify and explain the classifications, properties, and uses of different refrigerants.

05.06 Explain how fluids react and flow in a closed versus an open environment or vessel.

05.07 Define and identify "color-coding" of refrigerant cylinders.
05.08 Compare pressure and temperature (P/T) charts.
05.09 Explain the proper methods of transferring, storing, and recovering refrigerants.
05.10 Explain the effects of an improper refrigerant and contaminants in a system.

06.0 FABRICATE AND SERVICE THE PIPING, TUBING, AND FITTINGS USED IN THE HEATING, AIR-CONDITIONING, AND REFRIGERATION INDUSTRY--The student will be able to:

06.01 Identify and explain the purpose of the piping, tubing, and fittings used in the heating, air-conditioning, and refrigeration industry.
06.02 Bend tubing, using tube benders.
06.03 Connect tubing, using
a. flared fittings
b. compression fittings
06.04 Connect tubing, using solderless connectors.
06.05 Connect tubing, using a swaged-joint connection.
06.06 Identify and use various types of torches.
06.07 Identify, select, and use appropriate soldering and brazing alloys, materials, and skills.
06.08 Explain the purposes and procedures for protecting piping materials and fabrication, such as valves, fittings, and products, from heat.
06.09 Solder and/or braze tubing, including aluminum.
06.10 Silver-braze brass, steel, and copper.
06.11 Demonstrate an understanding of the procedures for installing pipe and tubing insulation.
06.12 Explain the procedures required for installing heating, air-conditioning, refrigerant, and ventilation accessories.
06.13 Fabricate and leak-test the piping, tubing, and fittings used in the heating, air-conditioning, and refrigeration industry.
06.14 Maintain project time and materials lists.

07.0 DEMONSTRATE A WORKING KNOWLEDGE OF HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEM COMPONENTS AND ACCESSORIES--The student will be able to:

07.01 Explain the types, operation, use, and maintenance requirements of
a. compressors (such as reciprocating, rotary, screw, and scroll)
b. condensers and evaporators (such as evaporative condensers, evaporative coils, shell and tube, tube within a tube, and fin and tube)
c. metering devices (such as adjusting automatic and thermostatic expansion valves, fixed orifices, and other devices available on the local market)
07.02 Evaluate metering-device performance.

07.03 Explain the methods of compression, lubrication, and compressor loading and unloading.
07.04 Analyze the operating condition of a compressor.
07.05 Test, troubleshoot, and correct the causes of mechanical problems in a heating, air-conditioning, and refrigeration system.
07.06 Identify the location and explain the uses of refrigerant flow accessories.
07.07 Identify the location and explain the uses of heating, air-conditioning, and refrigeration-system accessories (such as receivers, dryers/filers, solenoid valves, heat exchangers, accumulators, suction filter, oil separators, evaporator pressure-regulating valve, crankcase pressure-regulating valves, and check valves).
07.08 Evaluate system performance.

08.0 APPLY APPROPRIATE COMMUNICATION AND COMPUTER SKILLS--The student will be able to:

08.01 Ask and answer questions coherently and concisely.
08.02 Read and follow written instructions and listen to and follow oral instructions.
08.03 Make oral presentations.
08.04 Write reports, using a word-processing software.
08.05 Read and interpret industry-related materials.
08.06 Find information in technical literature, such as a manufacturer's manual.
08.07 Interpret graphs, charts, diagrams, and tables commonly used in the industry.
08.08 Fill out the forms and invoices commonly used in the industry.
08.09 Demonstrate appropriate telephone communications skills.
08.10 Use industry-related computer software.

09.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

09.01 Define "entrepreneurship."
09.02 Explain the importance of entrepreneurship to the United States economy.
09.03 Discuss the advantages and disadvantages of business ownership.
09.04 Explain the risks involved in the ownership of a business.
09.05 Identify the personal characteristics of a successful entrepreneur.
09.06 Identify the business skills needed to operate a small business efficiently and effectively.
09.07 Describe the employer's responsibilities to support the business and industry.
09.08 Demonstrate a working knowledge of state and local licensing requirements.

10.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

10.01 Conduct a job search and identify advanced-training opportunities and their requirements.
10.02 Calculate the employer's investment cost for an employee.
10.03 Secure information about a job, including employee benefits.
10.04 Write a resume.
10.05 Evaluate a job offer, considering various factors such as career advancement, job satisfaction, employee benefits, etc.
10.06 Demonstrate ethical and responsible practices.
10.07 Exhibit pride in the quality of work performed.
10.08 Describe the advantages of a good driving record and the ramifications of a poor driving record on employability opportunities.
10.09 Explain the Florida "Right-to-Know" law that describes the Material Safety Data Sheet (MSDS).
10.10 Explain the importance of confidentiality in the workplace.
10.11 Discuss the effects of positive human-relation skills on success in the business.
10.12 Demonstrate appropriate responses to performance evaluations from the employer, the supervisor, and other persons in the workplace.

OCCUPATIONAL COMPLETION POINT - DATA CODE B

Heating, A/C, and Refrigeration Mechanic Assistant - Industry Title

11.0 DEMONSTRATE A PRACTICAL KNOWLEDGE OF BASIC ELECTRICITY AND OF THE ELECTRICAL COMPONENTS OF HEATING, AIR-CONDITIONING, AND REFRIGERATION EQUIPMENT--The student will be able to:

11.01 Explain the principles of electricity.
11.02 Explain single- and three-phase power distribution.
11.03 Define and explain watts, ohms, volts, and amps.
11.04 Identify and explain electrical measuring tools and devices.
11.05 Explain the standards for and ways to measure watts, resistance, voltage, and amperage, using appropriate instruments or devices.
11.06 Identify and explain appropriate electrical wiring symbols.
11.07 Draw and explain a wiring schematic diagram for a control system.
11.08 Create a wiring schematic for each of the following, using all components and symbols for safe and effective operation and interpretation:
a. an air-conditioner
b. an electric furnace
c. a heat pump
d. an oil furnace
e. a gas furnace

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11.09 Explain codes and standards and safety requirements for working with the electrical components used in heating, air conditioning, and refrigeration.

11.10 Troubleshoot protection devices, such as fuses and breakers.

11.11 Interpret tables and charts from the National Electrical Codes (NEC).

12.0 TROUBLESHOOT HEATING, AIR-CONDITIONING, AND REFRIGERATION ELECTRICAL CONTROL SYSTEMS AND THEIR COMPONENTS--The student will be able to:

12.01 Identify and explain the operations of electrical control systems and their components (such as heat anticipators, heat and cool thermostats, outdoor thermostats/low ambient controls, defrost controls/timers, and auxiliary heating controls).

12.02 Identify, install, and troubleshoot controls for heating, air-conditioning, and refrigeration systems.

12.03 Explain the operation of different types of electromechanical thermostats.

12.04 Wire basic heating, air-conditioning, and refrigeration systems.

12.05 Troubleshoot operational problems for different types of electromechanical thermostats.

12.06 Explain the electrical and mechanical operations of the basic heat pump.

13.0 TROUBLESHOOT AND WIRE ELECTRICAL MOTORS AND THEIR COMPONENTS--The student will be able to:

13.01 Identify and explain the functions of various types of motors and their components.

13.02 Troubleshoot, test, and analyze motors, using various methods.

13.03 Identify, troubleshoot, and wire various types of electric motors.

13.04 Reverse the rotation of a motor.

14.0 ASSIST IN THE INSTALLATION OF A RESIDENTIAL HEATING AND AIR-CONDITIONING SYSTEM AND DETERMINE START-UP PROCEDURES--The student will be able to:

14.01 Read and comply with dispatch orders.

14.02 Explain local codes and ordinances.

14.03 Select and use appropriate tools and safety practices to test equipment.

14.04 Determine the electrical requirements of equipment.

14.05 Assist in the installation of a heating and air-conditioning system to the manufacturer's installation and operation specifications, using a practical knowledge of duct fabrication methods.

14.06 Determine the proper charge in a residential air-conditioning unit and adjust superheat.

14.07 Determine the temperature drop across the evaporator.
14.08 Determine the temperature rise across the condenser.
14.09 Write a service report.
14.10 Apply good customer-relations skills.

15.0 DEMONSTRATE A WORKING KNOWLEDGE OF MECHANICAL HEATING AND AIR-CONDITIONING SYSTEM OPERATIONS AND OF START-UP AND CHECK-OUT PROCEDURES--The student will be able to:

15.01 Identify and explain:
a. air-to-air heat-pump systems
b. water-to-air heat-pump systems
c. water-to-water heat-pump systems
d. air-to-ground heat-pump systems (geothermal)
e. open-loop heat-pump systems
f. closed-loop heat-pump systems
15.02 Determine the start-up and check-out procedures recommended by different manufacturers.
15.03 Determine the electrical requirements of equipment.
15.04 Select and use appropriate tools, instruments, and test equipment, following safety precautions.
15.05 Determine the temperature drop across the outdoor coil on a heat pump.
15.06 Determine the temperature rise across the indoor coil on a heat pump.
15.07 Test for a proper refrigerant charge in a residential heat pump.
15.08 Apply good customer-relations skills.

16.0 SIZE HEATING, AIR-CONDITIONING, AND REFRIGERATION PIPING--The student will be able to:

16.01 Identify and explain various types of heating, air-conditioning, and refrigeration piping.
16.02 Calculate and size various types of heating, air-conditioning, and refrigeration piping for various tasks.
16.03 Explain pressure and temperature drops.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
Heating, A/C, and Refrigeration Mechanic - OES 85902654

17.0 DEMONSTRATE A PRACTICAL KNOWLEDGE OF SOLID-STATE ELECTRONICS AS USED IN HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEMS--The student will be able to:

17.01 Explain the basic principles and functions of direct digital control (DDC).
17.02 Explain basic solid-state circuits and boards.
17.03 Identify, test, and replace circuits and boards.
17.04 Identify and explain the functions of a building-management system.
17.05 Program a programmable thermostat.

18.0 UTILIZE AND OPERATE MECHANICAL REFRIGERATION SERVICING AND TESTING EQUIPMENT--The student will be able to:

18.01 Identify the effects of superheat and subcooling on a system.
18.02 Identify and explain the functions of servicing and testing equipment (such as vacuum pumps, micron gauges, EPA-approved equipment, leak detectors, and charging systems).
18.03 Operate a refrigerant recovery system.
18.04 Explain the standards for and ways to measure, test, maintain, and evacuate a mechanical heating, air-conditioning, and refrigeration system.
18.05 Evacuate the refrigerant system with various vacuum methods.
18.06 Demonstrate compliance with Environmental Protection Agency (EPA) rules and regulations and, if possible, take the EPA test.
18.07 Charge various air-conditioning and mechanical refrigeration systems by various methods.
18.08 Demonstrate the effects of superheat and subcooling on a system.

19.0 USE COMBUSTION-TYPE HEATING SERVICING AND TESTING EQUIPMENT--The student will be able to:

19.01 Explain combustion theory and the safety precautions for using combustion-type heating servicing and testing equipment.
19.02 Install a combustion-type heating unit to the manufacturer's and code requirements.
19.03 Identify and explain the various types of combustion-type heating servicing and testing equipment (such as draft gauge, U-tube manometer, sling psychrometer, millivolt meter, and oil-furnace testing equipment).
19.04 Use the servicing and testing equipment.
19.05 Test, analyze, and troubleshoot combustion-type heating systems.

20.0 TROUBLESHOOT GAS VALVES AND REGULATORS AS USED IN HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEMS--The student will be able to:

20.01 Identify and discuss the safety and regulation issues and concerns.
20.02 Explain the operations of various types of gas valves and regulators (such as low-voltage, line-voltage, pneumatic, solenoid, and gas and pressure regulators).
20.03 Identify and size various types of gas valves and regulators.
20.04 Determine the application of gas valves and regulators.
20.05 Troubleshoot gas valves and regulators.

21.0 DETERMINE THE PROPERTIES OF AIR--The student will be able to:

21.01 Explain the principles of psychrometrics.
21.02 Identify and explain the components and uses of a psychrometric meter.
21.03 Identify indoor-air-quality concerns as related to psychrometrics.
21.04 Determine the properties of air, using a psychrometric chart.
21.05 Follow safety precautions.
21.06 Identify and explain the different types and benefits of
a. air-filtration systems
b. air-handling systems
c. ventilation systems
21.07 Fabricate, operate, maintain, and troubleshoot
a. air-filtration systems
b. air-handling systems
c. ventilation systems

22.0 USE A PRESSURE ENTHALPY CHART TO DIAGRAM REFRIGERANT CYCLES--The student will be able to:

22.01 Identify all components of the pressure enthalpy chart.
22.02 Define "enthalpy" and "entropy."
22.03 Diagram several refrigerant cycles, using the pressure enthalpy chart.

23.0 EXPLAIN THE STANDARDS FOR AND WAYS TO MEASURE INDOOR-AIR QUALITY--The student will be able to:

23.01 Define indoor-air quality.
23.02 Identify and explain the codes and standards regarding indoor-air quality.
23.03 Select and use indoor-air-quality measuring devices.
23.04 Explain the standards for and ways to measure indoor-air quality, using various methods.

24.0 DEMONSTRATE THE INSTALLATION, MAINTENANCE, AND REPAIR OF HEATING, AIR-CONDITIONING, AND REFRIGERATION SYSTEMS--The student will be able to:

24.01 Follow safety precautions.
24.02 Describe new technologies in heating, air-conditioning, and refrigeration installation, including
a. variable-speed motors
b. heat-pipe systems
c. desiccant systems
d. gas-driven heating systems
24.03 Apply local and national codes.
24.04 Lay out, construct, and troubleshoot comfort systems.
24.05 Test and analyze systems.
24.06 Test and analyze heat-recovery systems.

OCCUPATIONAL COMPLETION POINT - DATA CODE D

Heating A/C and Refrigeration Technician - Industry Title

25.0 TEST AND SIZE ELECTRICAL GENERATION AND DISTRIBUTION COMPONENTS FOR COMMERCIAL HEATING AND AIR-CONDITIONING SYSTEMS--The student will be able to:

25.01 Determine wire sizes and voltage drops.
25.02 Draw and identify power-transformer types.
25.03 Test, size, and replace protection devices such as fuses and breakers, motor starters, and overloads.

26.0 MAINTAIN, TEST, AND TROUBLESHOOT ELECTRICAL MOTORS AND THEIR COMPONENTS FOR COMMERCIAL HEATING AND AIR-CONDITIONING SYSTEMS--The student will be able to:

26.01 Identify and explain the operations and applications of various types of electrical motors and their components as used in commercial heating and air-conditioning systems.
26.02 Maintain, test, and troubleshoot various types of commercial electrical motors and their components as used in commercial heating and air-conditioning systems.
26.03 Demonstrate the proper use of motor testing equipment.

27.0 DEMONSTRATE A WORKING KNOWLEDGE OF ENGINEERED CONTROL SYSTEMS AS USED IN COMMERCIAL HEATING AND AIR-CONDITIONING SYSTEMS--The student will be able to:

27.01 Identify and explain the various types of engineered control systems and their sequences of operation as used in commercial heating and air-conditioning systems.
27.02 Maintain, test, and troubleshoot various types of engineered control systems as used in commercial heating and air-conditioning systems.

28.0 MAINTAIN AND TROUBLESHOOT PNEUMATIC CONTROL SYSTEMS FOR COMMERCIAL HEATING AND AIR-CONDITIONING APPLICATIONS--The student will be able to:

28.01 Identify pneumatic control systems.
28.02 Demonstrate the ability to maintain and troubleshoot pneumatic control systems.

29.0 TROUBLESHOOT ELECTRICAL CIRCUITS AS USED IN COMMERCIAL HEATING AND AIR-CONDITIONING SYSTEMS--The student will be able to:

29.01 Explain how the principles of designing an electrical system for residential heating and air-conditioning systems apply to commercial heating and air-conditioning systems.
29.02 Define and compare single- and multiphase voltage and current related to commercial heating and air-conditioning systems.

29.03 Calculate various circuit loads in commercial heating and air-conditioning applications, using Ohm's law.
29.04 Calculate the electrical circuit loads used in commercial heating and air-conditioning applications.
29.05 Troubleshoot electrical circuits for commercial heating and air-conditioning systems.

30.0 SELECT APPROPRIATE COMMERCIAL COMPRESSORS--The student will be able to:

30.01 Compare commercial-compressor requirements with those for residential and light commercial heating and air-conditioning systems.
30.02 Select appropriate commercial compressors for cooling requirements.

31.0 TEST AND ADJUST COMMERCIAL EVAPORATIVE CONDENSERS--The student will be able to:

31.01 Determine the proper air and fluid flow for commercial evaporative condensers.
31.02 Test and adjust the airflow for proper temperature difference.
31.03 Test and adjust the water flow for proper GPM and temperature difference.

32.0 MAINTAIN, TEST, AND TROUBLESHOOT COMMERCIAL EVAPORATORS--The student will be able to:

32.01 Determine the operational requirements for evaporators used in commercial heating and air-conditioning applications.
32.02 Select appropriate evaporators for commercial heating and air-conditioning systems.
32.03 Maintain, test, and adjust various commercial heating and air-conditioning accessories.

33.0 MAINTAIN, TEST, AND ADJUST COMMERCIAL HEATING AND AIR-CONDITIONING ACCESSORIES--The student will be able to:

33.01 Compare commercial accessories with residential and light- commercial-heating and air-conditioning accessories.
33.02 Select the heating and air-conditioning accessories appropriate for various commercial applications.
33.03 Maintain, test, and adjust commercial heating and air-conditioning accessories.

34.0 MAINTAIN, TROUBLESHOOT, AND REPAIR COMMERCIAL HEATING SYSTEMS--The student will be able to:

34.01 Apply local and national codes and safety practices.
34.02 Keep a record of the installation, maintenance, and repair of commercial heating systems.

34.03 Identify the components of various commercial heating systems.

34.04 Explain the operational principles of various commercial heating systems.

34.05 Test and analyze heating air-distribution systems.

34.06 Maintain, troubleshoot, and repair various commercial heating systems, including
- a. a gas furnace and boiler
- b. an oil furnace and boiler
- c. an electric furnace
- d. electric heaters
- e. a heat pump
- f. solar-heating systems

34.07 Maintain, troubleshoot, and repair heat-recovery units.
- a. Identify the uses, including freeze-protection and superheating, for potable water or hot water.
- b. Identify components and their functions.
- c. Explain the method of operation for various heat-recovery systems.
- d. Troubleshoot and repair common problems.

34.08 Design a commercial heating system.

35.0 MAINTAIN AND REPAIR THERMAL STORAGE SYSTEMS--The student will be able to:

35.01 Apply appropriate codes, standards, and safety practices.

35.02 Describe the benefits and limitations of each type.

35.03 Explain the operational principles of a thermal storage system.

35.04 Identify and explain various types of thermal storage systems.

35.05 Maintain, troubleshoot, and test various types of thermal storage systems.

36.0 MAINTAIN, TROUBLESHOOT, AND REPAIR COMMERCIAL HEATING AND AIR-CONDITIONING SYSTEMS--The student will be able to:

36.01 Keep a record of the installation, maintenance, and repair of commercial heating and air-conditioning systems.

36.02 Apply local and national codes and safety practices.

36.03 Lay out a commercial heating and air-conditioning system.

36.04 Lay out a typical split commercial air-conditioning system.

36.05 Lay out a typical split commercial heating system.

36.06 Maintain, test, analyze, and repair various types of commercial heating and air-conditioning systems.

36.07 Maintain, troubleshoot, and repair
- a. cooling towers
- b. water-cooled condensers
- c. water-treatment systems
- d. chilled water systems

37.0 CALCULATE COMMERCIAL HEATING AND AIR-CONDITIONING LOADS--The student will be able to:

37.01 Explain conduction as a heat-load source.
37.02 Describe the implications of conducting and the resistance values for different types of construction materials.
37.03 Define "U" value (BTU/hr/ft^2°F).
37.04 Define "K" value (°Fft^{2}hr/BTU).
37.05 Define "C" value (°Fft^{2}hr/BTU).
37.06 Define "R" value (°Fft^{2}hr/BTU).
37.07 Interpret heat-transfer tables ("U," "K," "C," and "R").
37.08 Locate the total heat-transfer value of any surface (R) - (U).
37.09 Explain infiltration and exfiltration/ventilation as a heat-load source.
37.10 Explain a product heat-load source.
37.11 Explain miscellaneous loads (people, motors, equipment) as heat-load sources.
37.12 Explain the purpose of vapor barriers.
37.13 Interpret tables of specific heat values as applied to commercial heating and air-conditioning systems.
37.14 Calculate and design systems.
37.15 Calculate cooling and heating equipment sizes.
37.16 Design and identify methods of installing air-movement systems.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Heavy Duty Truck and Bus Mechanics
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I470605**
CIP Number	0647.060501
Grade Level	30, 31
Length	1,800 hours
Certification	DESEL MECH @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as truck and bus mechanics (625.281-010). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content will include the following: maintaining and repairing diesel engines and electrical systems; reconditioning diesel fuel injection systems; overhauling diesel engines; performing diesel engine preventive maintenance and repairing chassis of heavy trucks and buses.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Heavy Duty Truck and Bus industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: troubleshooting and repair of specialty areas including Caterpillar diesel mechanics, Cummins diesel mechanics, IHC and Mack diesel mechanics.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work

station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 8.0, Language 8.0, Reading 8.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1800 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in performing diesel trade skills.
02.0 Demonstrate proficiency in applying electrical principles.
03.0 Demonstrate proficiency in applying electronic principles.
04.0 Demonstrate proficiency in maintaining and repairing gasoline and diesel engines.
05.0 Demonstrate proficiency in maintaining and repairing electrical systems.
06.0 Demonstrate proficiency in reconditioning diesel fuel injection systems.
07.0 Demonstrate proficiency in reconditioning diesel engine components.
08.0 Demonstrate proficiency in maintaining and repairing power train systems and components.
09.0 Demonstrate proficiency in maintaining and repairing brake systems.
10.0 Demonstrate proficiency in maintaining and repairing chassis components.
11.0 Demonstrate proficiency in maintaining and repairing hydraulic systems.
12.0 Demonstrate proficiency in maintaining and repairing air conditioning and heating systems.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate appropriate math skills.
15.0 Demonstrate appropriate understanding of basic science.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Heavy Duty Truck And Bus Mechanics
Secondary Number:
Postsecondary Number: I470605

01.0 DEMONSTRATE PROFICIENCY IN PERFORMING DIESEL TRADE SKILLS--The student will be able to:

- 01.01 Follow safety practices
- 01.02 Apply basic math skills.
- 01.03 Apply intermediate math skills.
- 01.04 Recognize, identify and make metric conversions.
- 01.05 Perform basic welding skills.
- 01.06 Use hand tools.
- 01.07 Use power tools.
- 01.08 Use measuring and precision tools.
- 01.09 Identify types of bearings and seals.
- 01.10 Identify power train components and functions.
- 01.11 Identify threaded fasteners by size, type, thread series, thread classes, material hardness and compatibility.
- 01.12 Read and use parts manuals.
- 01.13 Read, interpret and apply service manuals.

02.0 DEMONSTRATE PROFICIENCY IN APPLYING ELECTRICAL PRINCIPLES--The student will be able to:

- 02.01 Identify the nature of electricity.
- 02.02 Analyze electrical circuits.
- 02.03 Define Ohm's and Kirchhoff's laws.
- 02.04 Identify magnetism and electromagnetic induction.
- 02.05 Identify applications of alternating current.
- 02.06 Identify principles of direct-current (DC) motors and generators.
- 02.07 Identify principles of alternating-current (AC) motors.
- 02.08 Locate and match electrical units by their symbols on a wiring diagram.
- 02.09 Set up and use voltmeters, ammeters and ohmmeters.

03.0 DEMONSTRATE PROFICIENCY IN APPLYING ELECTRONIC PRINCIPLES--The student will be able to:

- 03.01 Identify principles of diodes and rectifiers.
- 03.02 Identify principles of voltage regulation and power supply circuits.
- 03.03 Identify principles of transistors.
- 03.04 Identify principles of the silicon controlled rectifier (SCR).
- 03.05 Identify component of electronic systems and their functions.

04.0 DEMONSTRATE PROFICIENCY IN MAINTAINING AND REPAIRING GASOLINE AND DIESEL ENGINES--The student will be able to:

04.01 Identify gasoline and diesel engine operating principles (two- and four-stroke cycle engines).
04.02 Identify components of two- and four-stroke cycle engines.
04.03 Troubleshoot and repair lubrication systems.
04.04 Troubleshoot and repair induction and exhaust systems.

05.0 DEMONSTRATE PROFICIENCY IN MAINTAINING AND REPAIRING ELECTRICAL SYSTEMS--The student will be able to:

05.01 Test and service batteries.
05.02 Test and repair starting systems.
05.03 Test and repair DC charging systems.
05.04 Test and repair ignition systems.
05.05 Test and repair lighting and accessories systems.
05.06 Test and service instruments and gauges.

06.0 DEMONSTRATE PROFICIENCY IN RECONDITIONING DIESEL FUEL INJECTION SYSTEMS--The student will be able to:

06.01 Identify fuel injection systems principles and components.
06.02 Troubleshoot fuel injection systems and components.
06.03 Remove, replace and adjust fuel injection systems and components.
06.04 Identify governor types and operating principles.
06.05 Troubleshoot governors.
06.06 Remove, repair or replace and adjust governors.

07.0 DEMONSTRATE PROFICIENCY IN RECONDITIONING DIESEL ENGINE COMPONENTS--The student will be able to:

07.01 Explain the basic principles of the operation of the four-stroke cycle diesel engine.
07.02 Identify engine assemblies and systems.
07.03 Diagnose valve and head problems by use of the visual inspection method.
07.04 Diagnose valve and head problems by use of the compression tester method or cylinder air pressure method.
07.05 Diagnose valve and head problems by use of the stethoscope method.
07.06 Disassemble engines.
07.07 Clean and inspect heads for cracks, warpage and injector sleeves.
07.08 Inspect valves for warpage, burns, cracks, stem war, tip wear and valve seat.
07.09 Grind valve seats and reface valves.
07.10 Check and inspect springs for free height, distortion and installed height.
07.11 Adjust valve lash.
07.12 Remove and inspect camshaft bearings and lifters.
07.13 Time valve drive assemblies.
07.14 Remove pistons from rod assemblies.
07.15 Measure out-of-round and cylinder taper with a dial bore gauge or micrometer.
07.16 Check piston pins and boss for wear.

07.17 Measure piston ring lands width, out-of-round and taper.
07.18 Measure the piston ring gap in a cylinder bore.
07.19 Install and fit piston pins.
07.20 Check rod and piston assembly alignment.
07.21 Remove and replace rod bearings.
07.22 Hone and clean cylinders.
07.23 Install rings on pistons.
07.24 Measure and check crankshafts with a micrometer.
07.25 Check the bearing bore with a telescoping gauge.
07.26 Reassemble engines using a plastic gauge.
07.27 Install oil seals.
07.28 Check for end play.

08.0 DEMONSTRATE PROFICIENCY IN MAINTAINING AND REPAIRING POWER TRAIN SYSTEMS AND COMPONENTS--The student will be able to:

08.01 Identify power train operating principles and components.
08.02 Troubleshoot power trains.
08.03 Recondition clutches.
08.04 Recondition standard transmissions.
08.05 Recondition automatic transmissions.
08.06 Recondition differentials and final drives.
08.07 Recondition drive lines.
08.08 Recondition power takeoffs.
08.09 Recondition transfer cases.

09.0 DEMONSTRATE PROFICIENCY IN MAINTAINING AND REPAIRING BRAKE SYSTEMS--The student will be able to:

09.01 Identify air brake principles and components.
09.02 Identify hydraulic brake principles and components.
09.03 Identify parking brake principles and components.
09.04 Identify anti-locking braking systems (ABS) principles and components.
09.05 Troubleshoot brake systems.
09.06 Service and recondition hydraulic brake systems.
09.07 Service and recondition air brake systems.
09.08 Service and recondition engine brakes.
09.09 Service and recondition parking brakes.

10.0 DEMONSTRATE PROFICIENCY IN MAINTAINING AND REPAIRING CHASSIS COMPONENTS--The student will be able to:

10.01 Recondition conventional steering systems.
10.02 Recondition hydraulic steering systems.
10.03 Recondition rear axle suspensions.
10.04 Recondition front axle suspensions.
10.05 Service wheels, bearings, hubs and seals.
10.06 Service tires.
10.07 Recondition fifth wheels.

11.0 DEMONSTRATE PROFICIENCY IN MAINTAINING AND REPAIRING HYDRAULIC SYSTEMS--The student will be able to:

11.01 Identify basic principles of hydraulics.
11.02 Identify operating components of hydraulic systems.
11.03 Locate and match hydraulic units by their symbols on a diagram.
11.04 Troubleshoot hydraulic circuits using test equipment.
11.05 Maintain hydraulic fluid, filters, lines and reservoirs.
11.06 Recondition hydraulic pumps and motors.
11.07 Recondition control valves.
11.08 Recondition hydraulic cylinders.
11.09 Recondition hydraulic accessories.

12.0 DEMONSTRATE PROFICIENCY IN MAINTAINING AND REPAIRING AIR CONDITIONING AND HEATING SYSTEMS--The student will be able to:

12.01 Inspect and pressure test a basic air conditioning (AC) system.
12.02 Inspect, remove and replace compressor belts.
12.03 Discharge, evacuate and charge a basic AC system.
12.04 Leak test a basic AC system.
12.05 Service AC electrical circuits.
12.06 Service vacuum circuits.
12.07 Diagnose basic AC system problems.
12.08 Remove and replace components in basic AC systems.
12.09 Remove and replace engine fan clutches.
12.10 Service air conditioning systems.
12.11 Service heating systems.
12.12 Remove and replace blower motors.
12.13 Diagnose heater malfunctions.
12.14 Remove and replace heater cores, control units and cables.

13.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

13.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
13.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
13.03 Read and follow written and oral instructions.
13.04 Answer and ask questions coherently and concisely.
13.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
13.06 Demonstrate appropriate telephone/communication skills.

14.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

14.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
14.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
14.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
14.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
14.05 Demonstrate an understanding of federal, state and local taxes and their computation.

15.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

15.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
15.02 Draw conclusions or make inferences from data.
15.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
15.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Identify documents that may be required when applying for a job.
16.04 Complete a job application form correctly.
16.05 Demonstrate competence in job interview techniques.
16.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
16.07 Identify acceptable work habits.
16.08 Demonstrate knowledge of how to make appropriate job changes.
16.09 Demonstrate acceptable employee health habits.
16.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define entrepreneurship.
17.02 Describe the importance of entrepreneurship to the American economy.
17.03 List the advantages and disadvantages of business ownership.
17.04 Identify the risks involved in ownership of a business.
17.05 Identify the necessary personal characteristics of a successful entrepreneur.
17.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Heavy Equipment Mechanics
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I470302**
CIP Number	0647.030200
Grade Level	30, 31
Length	1800 hours
Certification	DESEL MECH @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as mobile heavy equipment mechanics (85314643), construction equipment mechanics (620.261-022), industrial truck mechanics (620.281-050), maintenance mechanics (620.281-046), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, troubleshooting, preventative maintenance, and repair of heavy equipment, including engines and components, and test operation of equipment.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Heavy Equipment industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in maintenance, repair and rebuilding components of heavy equipment including engines, electrical systems, fuel systems, tracks, brake systems, hydraulic systems, power transfer and drive systems, and chassis. Test operation of repaired equipment is included.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has

chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 8.0, Language 8.0, Reading 8.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1800 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate knowledge of safety, communication and leadership skills required in the trade.
02.0 Demonstrate the use and care of hand tools, power tools, and equipment.
03.0 Identify engine components.
04.0 Maintain, troubleshoot, and overhaul heavy equipment engines.
05.0 Maintain, troubleshoot, and repair electrical systems.
06.0 Maintain, troubleshoot, and repair fuel systems.
07.0 Maintain and repair track systems.
08.0 Maintain and repair mechanical, hydraulic, and air brake systems.
09.0 Maintain, troubleshoot, and repair hydraulic systems.
10.0 Maintain, troubleshoot, and repair winches, clutches and transmissions.
11.0 Maintain, troubleshoot and repair differentials, final drives, and drivelines.
12.0 Inspect and repair chassis.
13.0 Test drive equipment.
14.0 Demonstrate ability to perform preventative maintenance and complete oil analysis program.
15.0 Demonstrate appropriate communication skills.
16.0 Demonstrate appropriate math skills.
17.0 Demonstrate appropriate understanding of basic science.
18.0 Demonstrate employability skills.
19.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Heavy Equipment Mechanics
Secondary Number:
Postsecondary Number: I470302

01.0 DEMONSTRATE KNOWLEDGE OF SAFETY, COMMUNICATION AND LEADERSHIP SKILLS REQUIRED IN THE TRADE--The student will be able to:

01.01 Comply with all safety rules and regulations.
01.02 Use all tools properly. (Only for their intended purpose.)
01.03 Read, interpret and apply service, manual knowledge to the satisfaction of the instructor.
01.04 Perform all assigned tasks utilizing integrity and doing your best work.

02.0 DEMONSTRATE THE USE AND CARE OF HAND TOOLS, POWER TOOLS, AND EQUIPMENT--The student will be able to:

02.01 Perform assigned tasks utilizing hand tools, power tools and equipment to the satisfaction of the instructor.
02.02 List basic rules concerning proper care of tools and equipment.
02.03 Identify safety methods utilized and steps to follow under an emergency type condition.

03.0 IDENTIFY ENGINE COMPONENTS--The student will be able to:

03.01 Identify each engine component from pictured materials by matching that component to its proper title and purpose.
03.02 Identify engine components displayed within the shop area to the satisfaction of the assigned instructor.

04.0 MAINTAIN, TROUBLESHOOT, AND OVERHAUL HEAVY EQUIPMENT ENGINES--The student will be able to:

04.01 Remove and replace cylinder head(s).
04.02 Remove and replace valves, springs, retainers and keepers.
04.03 Clean cylinder head and check it for cracks.
04.04 Reface valves.
04.05 Grind valve seats.
04.06 Check valve guides.
04.07 Remove, check and replace oil pan.
04.08 Remove piston and rod assemblies.
04.09 Clean piston and ring grooves.
04.10 Install piston rings.
04.11 Install piston and rod assemblies in block.
04.12 Check cylinder head for warpage.
04.13 Check cylinder block for warpage and cracks.
04.14 Tap-out threaded holes.
04.15 Remove and replace timing gear cover.
04.16 Remove and replace flywheel and flywheel housing.
04.17 Install front and rear crankshaft seal.

04.18 Remove crankshaft.
04.19 Measure crankshaft (main and rod journals).
04.20 Install main bearings.
04.21 Install rod bearings.
04.22 Check installed main and rod bearing clearance.
04.23 Torque main bearing and rod bearing caps.
04.24 Torque cylinder head(s).
04.25 Adjust valves.
04.26 Adjust injectors and injection control rack.
04.27 Remove and install water pump.
04.28 Remove and install oil pump.
04.29 Dissemble and re-assemble oil pump.
04.30 Remove and install injection pump.
04.31 Remove and install turbocharger.
04.32 Remove and install blower.
04.33 Disassemble and reassemble blower.
04.34 Measure blower clearances.
04.35 Remove and install vibration damper.
04.36 Adjust governor.
04.37 Set idle speeds (low and high).
04.38 Remove and install air and oil filter.

05.0 MAINTAIN, TROUBLESHOOT, AND REPAIR ELECTRICAL SYSTEMS--The student will be able to:

05.01 Remove, clean and install battery.
05.02 Install batteries correctly where two or more batteries are utilized.
05.03 Install battery cables correctly for a series hook-up.
05.04 Visually inspect a battery.
05.05 Test battery with hydrometer, voltmeter and load tester.
05.06 Make connections and charge a battery.
05.07 Remove a starter and install starter.
05.08 Troubleshoot an electrical starting system.
05.09 Replace a starter drive.
05.10 Replace starter motor brushes and solenoid.
05.11 Troubleshoot starter motor on vehicle.
05.12 Troubleshoot starter motor on bench.
05.13 Test armature for shorts, grounds and opens.
05.14 Test field coils for opens and grounds.
05.15 Remove and replace alternator.
05.16 Troubleshoot an electrical charging system with alternator.
05.17 Test alternator rotor for grounds, shorts and opens.
05.18 Test alternator starter windings for grounds and opens.
05.19 Test and replace regulator.

06.0 MAINTAIN,TROUBLESHOOT, AND REPAIR FUEL SYSTEMS--The student will be able to:

06.01 Adjust engine high speed.
06.02 Adjust engine idle.
06.03 Bleed fuel system.
06.04 Calibrate governor.
06.05 Clean injector.

06.06 Install and time fuel injection pump.
06.07 Replace fuel filters.
06.08 Replace fuel injector.
06.09 Troubleshoot fuel injection pump.
06.10 Troubleshoot fuel injector.

07.0 MAINTAIN AND REPAIR TRACK SYSTEMS--The student will be able to:

07.01 Remove and replace track assembly, master pin type.
07.02 Remove and replace track assembly, split master link type.
07.03 Replace bolt on sprocket segments.
07.04 Measure track assembly for wear, link height, internal pin and bushing and external bushing.
07.05 Measure sprocket for wear.
07.06 Measure bottom rollers for wear.
07.07 Measure top rollers for wear.
07.08 Measure idler for wear.
07.09 Align roller frame to sprocket.
07.10 Align top roller and idler to sprocket.
07.11 Remove and replace roller frame.
07.12 Remove and replace top rollers.
07.13 Remove and replace bottom rollers.
07.14 Repair bottom rollers.
07.15 Repair top rollers.

08.0 MAINTAIN AND REPAIR MECHANICAL, HYDRAULIC, AND AIR BRAKE SYSTEMS--The student will be able to:

08.01 Remove and replace brake master cylinder.
08.02 Bleed air from brake master cylinder.
08.03 Rebuild single piston master cylinder.
08.04 Remove, repair and replace necessary items in a drum type brake assembly.
08.05 Adjust drum type brakes.
08.06 Rebuild brake cylinder.
08.07 Measure for wear on brake drum.
08.08 Remove and replace caliper on disk type brake.
08.09 Rebuild caliper assembly.
08.10 Replace brake pads.
08.11 Bleed air from brakes.
08.12 Measure disk for wear.
08.13 Remove, repair and reassemble cam type air drum brake.
08.14 Remove, repair and reassemble wedge type air drum brake.
08.15 Adjust slack adjuster on cam type air drum brake.
08.16 Rebuild air chamber (single and double chamber).
08.17 Remove, repack, replace and adjust wheel bearings.
08.18 Troubleshoot vacuum booster.
08.19 Troubleshoot hydrovac booster.
08.20 Service air brake system.
08.21 Repair air compressor.
08.22 Adjust air compressor governor.

09.0 MAINTAIN, TROUBLESHOOT, AND REPAIR HYDRAULIC SYSTEMS--The student will be able to:

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09.01 Drain and refill hydraulic reservoir making all checks for contaminated fluid.
09.02 Remove and replace all hydraulic system screens and filters.
09.03 Remove and replace hydraulic hoses and metal lines.
09.04 Remove and replace hydraulic system oil pump.
09.05 Rebuild gear and vane type pump.
09.06 Troubleshoot hydraulic pump.
09.07 Check oil pressure.
09.08 Adjust relief valve.
09.09 Remove and replace hydraulic control valves.
09.10 Repair hydraulic control valves.
09.11 Troubleshoot hydraulic control valve.
09.12 Remove and replace hydraulic cylinder.
09.13 Rebuild hydraulic cylinder.
09.14 Troubleshoot hydraulic cylinder.

10.0 MAINTAIN, TROUBLESHOOT, AND REPAIR WINCHES, CLUTCHES AND TRANSMISSIONS--The student will be able to:

10.01 Demonstrate knowledge and ability to troubleshoot, maintain and repair winches.
10.02 Remove and replace steering clutch and steering brake.
10.03 Rebuild steering clutch.
10.04 Adjust push type master clutch.
10.05 Adjust pull type master clutch.
10.06 Inspect flywheel surface for wear or cracks.
10.07 Remove and replace push type master clutch, single or double disk.
10.08 Remove and replace pull type master clutch, single or double disk.
10.09 Replace pilot bearing.
10.10 Replace clutch stop brake.
10.11 Replace clutch release bearing.
10.12 Remove and replace truck transmission.
10.13 Rebuild manual transmission.
10.14 Adjust linkage.
10.15 Remove and replace power shift torque converter.
10.16 Rebuild torque converter.
10.17 Remove and replace power shift transmission.
10.18 Rebuild power shift transmission.
10.19 Adjust linkage on power shift transmission.

11.0 MAINTAIN, TROUBLESHOOT AND REPAIR DIFFERENTIALS, FINAL DRIVES, AND DRIVELINES--The student will be able to:

11.01 Remove and replace sprocket assembly with seals.
11.02 Remove and replace final drive assembly.
11.03 Remove, replace and adjust bevel gear and shaft.
11.04 Set bevel gear and pinion clearance.
11.05 Inspect drive shaft for correct timing.
11.06 Replace universal joints.
11.07 Adjust ring gear shaft for correct bearing preload.
11.08 Adjust pinion shaft for correct bearing preload.

11.09 Adjust pinion shaft for correct bearing alignment depth.
11.10 Adjust ring gear to pinion clearance.

12.0 INSPECT AND REPAIR CHASSIS--The student will be able to:

12.01 Demonstrate general knowledge of chassis damage assessment and repairs verbally or by written examination.

13.0 TEST DRIVE EQUIPMENT--The student will be able to:

13.01 Identify needed repairs to the instructor from test driving equipment where liability and safety allow such tests.

14.0 DEMONSTRATE ABILITY TO PERFORM PREVENTATIVE MAINTENANCE AND COMPLETE OIL ANALYSIS PROGRAM--The student will be able to:

14.01 Student must check all fluids, air, electrical systems, undercarriage components etc. and perform needed service or repair to the satisfaction of the instructor.
14.02 Student must demonstrate ability to remove oil sample for oil analysis.
14.03 Student must be able to explain the importance of the oil analysis verbally or by written exam.

15.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

15.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
15.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
15.03 Read and follow written and oral instructions.
15.04 Answer and ask questions coherently and concisely.
15.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
15.06 Demonstrate appropriate telephone/communication skills.

16.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

16.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
16.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
16.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
16.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
16.05 Demonstrate an understanding of federal, state and local taxes and their computation.

17.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

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17.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
17.02 Draw conclusions or make inferences from data.
17.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
17.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct a job search.
18.02 Secure information about a job.
18.03 Identify documents which may be required when applying for a job interview.
18.04 Complete a job application form correctly.
18.05 Demonstrate competence in job interview techniques.
18.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
18.07 Identify acceptable work habits.
18.08 Demonstrate knowledge of how to make appropriate job changes.
18.09 Demonstrate acceptable employee health habits.
18.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

19.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

19.01 Define entrepreneurship.
19.02 Describe the importance of entrepreneurship to the American economy.
19.03 List the advantages and disadvantages of business ownership.
19.04 Identify the risks involved in ownership of a business.
19.05 Identify the necessary personal characteristics of a successful entrepreneur.
19.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Heavy Equipment Operation
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I490202**
CIP Number	0649.020200
Grade Level	30, 31
Length	1440 hours
Certification	OPER ENGR @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for initial employment with occupational titles as operating engineers (97956968), (859.683-010) or to provide supplemental training for persons previously or currently employed in these occupations. Students may elect to train on individual machines of their choice as a certification option.

The content should include, but not be limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and skills to operate and maintain a variety of heavy equipment as crawler tractors, motor graders, scrapers and shovels or cranes. Students training on one machine must complete all related program content.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Heavy Equipment industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in digging, ditching, sloping, stripping, grading, backfilling, clearing, excavating, and equipment maintenance.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is an appropriate vocational student organization for providing leadership training experiences and reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional program.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 7.0, Language 7.0, Reading 7.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1440 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate understanding of procedures.
02.0 Demonstrate understanding of operation and maintenance of mechanical systems and engines.
03.0 Operate pneumatic and crawler-type tractor with attachments.
04.0 Operate a back hoe.
05.0 Operate a motor grader.
06.0 Operate a crane.
07.0 Utilize utility construction equipment as applicable.
08.0 Demonstrate appropriate communication skills.
09.0 Demonstrate appropriate math skills.
10.0 Demonstrate appropriate understanding of basic science.
11.0 Demonstrate employability skills.
12.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Heavy Equipment Operation
Secondary Number:
Postsecondary Number: I490202

01.0 DEMONSTRATE UNDERSTANDING OF PROCEDURES--The student will be able to:

- 01.01 Apply safety practices during operation of heavy equipment.
- 01.02 Discuss function of each piece of heavy equipment as appropriate.
- 01.03 Turn and back-up equipment safely.
- 01.04 Operate equipment on roadway safely.

02.0 DEMONSTRATE UNDERSTANDING OF OPERATION AND MAINTENANCE OF MECHANICAL SYSTEMS AND ENGINES--The student will be able to:

- 02.01 Perform preventive maintenance on equipment including greasing, changing oil, and replacing filters.
- 02.02 Perform additional maintenance based on specific equipment needs.
- 02.03 Safety check equipment prior to operation.

03.0 OPERATE PNEUMATIC AND CRAWLER-TYPE TRACTOR WITH ATTACHMENTS--The student will be able to:

- 03.01 Move, level, and spread top soil.
- 03.02 Remove stumps.
- 03.03 Pile debris for burning.
- 03.04 Remove and replace dozer blade.
- 03.05 Remove and replace bucket.
- 03.06 Attach cutting teeth as needed.
- 03.07 Safely load dump trucks.

04.0 OPERATE BACK HOE--The student will be able to:

- 04.01 Dig pit to specified grade.
- 04.02 Observe for cables, pipes, and underground utilities.
- 04.03 Dig ditches for drainage and pipes.
- 04.04 Install bucket teeth to back hoe

05.0 OPERATE A MOTOR GRADER--The student will be able to:

- 05.01 Grade to specific levels.
- 05.02 Apply use of grading stakes when operating motor grade.
- 05.03 Build a road-bed.
- 05.04 Perform blue-top grade (finish).
- 05.05 Change blade and scarifier teeth on motor grader.

06.0 OPERATE A CRANE--The student will be able to:

- 06.01 Apply crane safety procedures.

06.02 Review "Construction Industry Manufactures Association" safety manuals.
06.03 Operate crane with drag bucket, clam-shell, and hook.
06.04 Load dump truck with crane.

07.0 UTILIZE UTILITY CONSTRUCTION EQUIPMENT AS APPLICABLE--The student will be able to:

07.01 Operate scraper.
07.02 Operate trencher.
07.03 Operate tar kettle.
07.04 Operate rollers.
07.05 Operate concrete mixer.

08.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

08.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
08.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
08.03 Read and follow written and oral instructions.
08.04 Answer and ask questions coherently and concisely.
08.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
08.06 Demonstrate appropriate telephone/communication skills.

09.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

09.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
09.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
09.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
09.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
09.05 Demonstrate an understanding of federal, state and local taxes and their computation.

10.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

10.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
10.02 Draw conclusions or make inferences from data.
10.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
10.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

11.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

11.01 Conduct a job search.
11.02 Secure information about a job.
11.03 Identify documents which may be required when applying for a job interview.
11.04 Complete a job application form correctly.
11.05 Demonstrate competence in job interview techniques.
11.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
11.07 Identify acceptable work habits.
11.08 Demonstrate knowledge of how to make appropriate job changes.
11.09 Demonstrate acceptable employee health habits.
11.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

12.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

12.01 Define entrepreneurship.
12.02 Describe the importance of entrepreneurship to the American economy.
12.03 List the advantages and disadvantages of business ownership.
12.04 Identify the risks involved in ownership of a business.
12.05 Identify the necessary personal characteristics of a successful entrepreneur.
12.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Industrial Cooperative Education-OJT
Occupational Area: Industrial Education

	Secondary	PSAV
Program Numbers	**8700400**	**I469999**
CIP Number	0646.9999CP	0646.9999CP
Grade Level	9-12, 30, 31	30, 31
Length	Multiple credits	Multiple hours
Certification	ANY INDUS ED G	ANY INDUS ED G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this course is to provide the on-the-job training component in conjunction with a job preparatory program to prepare students for employment in industrial occupations. On-the-Job experiences are provided as an addition to a job preparatory program which will develop occupational competencies required for employment in the occupation chosen by the student as a career choice or to provide experiences that further develop the competencies acquired by the student in an in-school job preparatory program. This method of delivery is not intended for supplemental vocational course instruction and shall not be claimed for supplemental FTE purposes.

The course content will include the following: accompanying related instruction; and the applied skill and knowledge required for the chosen occupation.

The course content should also include employability skills; training in communication, leadership, human relations, teamwork; and safe, efficient work practices.

II. **LABORATORY ACTIVITIES:** Training at a job site is the primary component of this instructional strategy. Students acquire competencies and job skills necessary to meet industry standards and correspondent program standards.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

When the cooperative method is offered, the following is required for each student: a training plan which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

The ICE - OJT course may be taken by a student for one or more semesters. A student may earn multiple credits in this course. The specific student performance standards which the student must achieve to earn credit must be specified in the OJT training plan.

The typical length of this course(s) and number of credits for a particular student will depend upon previous levels of competency attainment and complexity of the chosen occupation as outlined in the training plan and may be combined with the correspondent job preparatory program to arrive at the total. A student must be enrolled in a job preparatory program in order to be reported as a completer. A student shall not be reported as a completer in Industrial Cooperative Education-OJT.

Outcomes and student performance standards which the handicapped student must master must be specified in each student's Individual Education Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate job related skills for the chosen occupation.
02.0 Demonstrate an understanding of entrepreneurship.
03.0 Demonstrate employability skills.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Industrial Cooperative Education - OJT
Secondary Number: 8700400
Postsecondary Number: I469999

01.0 DEMONSTRATE JOB RELATED SKILLS FOR THE CHOSEN OCCUPATION--The student will be able to:

01.01 Demonstrate competencies from appropriate curriculum frameworks/student performance standards, as identified in the student training plan.

02.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

02.01 Define entrepreneurship.
02.02 Describe the importance of entrepreneurship to the American economy.
02.03 List the advantages and disadvantages of business ownership.
02.04 Identify the risks involved in ownership of a business.
02.05 Identify the necessary personal characteristics of a successful entrepreneur.
02.06 Identify the business skills needed to operate a small business efficiently and effectively.

03.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

03.01 Conduct a job search.
03.02 Secure information about a job.
03.03 Identify documents which may be required when applying for a job interview.
03.04 Complete a job application form correctly.
03.05 Demonstrate competence in job interview techniques.
03.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
03.07 Identify acceptable work habits.
03.08 Demonstrate knowledge of how to make appropriate job changes.
03.09 Demonstrate acceptable employee health habits.
03.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Industrial Education Directed Study
Occupational Area:	Industrial
	Secondary
Program Numbers	**8700100**
CIP Number	0647.999901
Grade Level	11-12, 30, 31
Length	Multiple credits
Certification	ANY INDUS ED G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to provide students with additional competencies in an Industrial Education program that will enhance their opportunities for employment in the occupation chosen by the student.

The content is prescribed by the instructor based upon the industrial student's assessed needs for directed study.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Industrial Education industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** A work station is provided as required to support the training activities of the student.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

This course may be taken only by a student who has completed, or is currently completing a specific secondary job preparatory program or occupational completion point for additional study in this program. A student may earn multiple credits in this course.

The selected intended outcomes and student performance standards which the student must master to earn credit must be outlined in an instructional plan developed by the instructor.

The student enrolled in this course must be reported using the Course Code Directory program number for the specific occupational completion point.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Perform designated job skills.
02.0 Demonstrate a knowledge of the basic skills in mathematics and language appropriate for the chosen occupation.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Industrial Education Directed Study
Secondary Number: 8700100
Postsecondary Number:

01.0 PERFORM DESIGNATED JOB SKILLS--The student will be able to:

- 01.01 Demonstrate job performance skills.
- 01.02 Follow prescribed safety procedures.
- 01.03 Display increasingly higher levels of productivity.

02.0 DEMONSTRATE A KNOWLEDGE OF THE BASIC SKILLS IN MATHEMATICS AND LANGUAGE APPROPRIATE FOR THE CHOSEN OCCUPATION--The student will be able to:

- 02.01 Use addition, subtraction, multiplication, and division to solve problems encountered in the chosen occupation.
- 02.02 Read, understand, and find information relative to the chosen occupation.
- 02.03 Write logical and grammatically correct statements and reports with correct spelling appropriate for the chosen occupation.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Industrial Electronics
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I470105**
CIP Number	0647.010500
Grade Level	30, 31
Length	1800 hours
Certification	RADIO TV @7 G
	ELECTRONIC @7 G
	TEC ELEC @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as electronics mechanics (828.281-010). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content includes, but is not limited to, direct current (DC), alternating current (AC), analog, relay, delay and time delay circuits; solid-state and digital devices; distribution, timing and control systems; microprocessors; industrial power supplies; transformers; DC and AC motors; digital motor controls; manual controllers; magnetic controllers and starters; pressure and strain measurements; temperature, photoelectric liquid level and process control; line diagrams and logic functions; gas and humidity sensing; telemetry; systems interface; schematics; soldering and chassis assembly techniques; laboratory practices; and technical recording and reporting.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Industrial Electronics industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; and a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

Electronic Technology and/or Electronic Engineering Technology are prerequisites for entry into this electronic specialization. Algebra is recommended as a prerequisite for entry into this program.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 10.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1800 hours when content from the Florida common core electronics program (Electronics Technology) is included.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in industrial power supplies.
02.0 Demonstrate proficiency in power distribution systems.
03.0 Demonstrate proficiency in basic control systems.
04.0 Demonstrate proficiency in DC motors.
05.0 Demonstrate proficiency in digital motor control.
06.0 Demonstrate proficiency in manual controllers.
07.0 Demonstrate proficiency in magnetic controllers.
08.0 Demonstrate proficiency in pressure and strain measurements.
09.0 Demonstrate proficiency in temperature control.
10.0 Demonstrate proficiency in photoelectric control.
11.0 Demonstrate proficiency in gas and humidity sensors.
12.0 Demonstrate proficiency in liquid level controls.
13.0 Demonstrate proficiency in line diagrams and logic functions.
14.0 Demonstrate proficiency in timing systems.
15.0 Demonstrate proficiency in time delay circuits.
16.0 Demonstrate proficiency in process control.
17.0 Demonstrate proficiency in telemetry.
18.0 Demonstrate proficiency in systems interface.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Industrial Electronics
Secondary Number:
Postsecondary Number: I470105

01.0 DEMONSTRATE PROFICIENCY IN INDUSTRIAL POWER SUPPLIES--The student will be able to:

- 01.01 Connect an unregulated power supply, measure voltages and calculate percentage of regulation.
- 01.02 Decrease the power supply impedance to improve regulation.
- 01.03 Connect a shunt regulator circuit.
- 01.04 Connect a series regulator circuit.
- 01.05 Connect a switching voltage regulator.
- 01.06 Set up a DC-to-AC inverter by adding a transformer module.
- 01.07 Connect a delta-primary, wye-secondary arrangement and measure its voltage.
- 01.08 Connect a half-wave power supply and measure voltages, ripple amplitude and ripple frequency.
- 01.09 Connect a three-phase, full-wave power supply and measure output voltages with and without filtering.
- 01.10 Connect a delta-primary, delta-secondary, full-wave power supply and measure output voltages with and without filtering.
- 01.11 Connect the power supply module for single-phase or three-phase output voltage.
- 01.12 Connect a step-down transformer to reduce the incoming voltage.

02.0 DEMONSTRATE PROFICIENCY IN POWER DISTRIBUTION SYSTEMS--The student will be able to:

- 02.01 Connect and verify single-phase and three-phase transformers in WYE to WYE installations.
- 02.02 Connect and verify single-phase and three-phase transformers in DELTA to DELTA installations.
- 02.03 Connect and verify single-phase and three-phase transformers in WYE to DELTA installations.
- 02.04 Connect and verify single-phase and three-phase transformers in DELTA to WYE installations.

03.0 DEMONSTRATE PROFICIENCY IN BASIC CONTROL SYSTEMS--The student will be able to:

- 03.01 Connect relays and lamp modules in a control system and determine the pull-in and drop-out currents.
- 03.02 Connect relays and lamp modules in a control system and determine the operating characteristics of solid-state relay.
- 03.03 Connect a multi-pushbutton control circuit for troubleshooting purposes.
- 03.04 Connect a test light for STOP and START pushbuttons.
- 03.05 Connect a test light for a control relay.
- 03.06 Connect an on-off control station with a pilot light.

03.07 Connect a solid state limit switch and cycle timer.
03.08 Connect a solid state limit switch to a control relay.
03.09 Connect a selector switch to a control circuit.

04.0 DEMONSTRATE PROFICIENCY IN DC MOTORS--The student will be able to:

04.01 Measure the resistances of the two field coils in a DC motor.
04.02 Connect a series type motor.
04.03 Measure the current drawn by the motor and calculate the CEMF generated in the motor for unloaded and loaded conditions.
04.04 Connect a shunt type motor.
04.05 Measure the shunt motor currents and calculate the CEMF.
04.06 Operate a compound motor with separate armature and field supply voltages.
04.07 Operate a compound motor from a single power supply, with and without load, measuring motor current and observing changes in speed.

05.0 DEMONSTRATE PROFICIENCY IN DIGITAL MOTOR CONTROL--The student will be able to:

05.01 Connect a stepping motor to its DC supply.
05.02 Vary the speed and direction of rotation of the stepping motor.
05.03 Program the logic source to make the motor perform in a predictable patter.
05.04 Program the stepping motor for control of rotary or linear displacement.

06.0 DEMONSTRATE PROFICIENCY IN MANUAL CONTROLLERS--The student will be able to:

06.01 Connect a manual starter to operate a three-phase motor.
06.02 Troubleshoot a manual starter.
06.03 Change motor rotation using a drum switch.

07.0 DEMONSTRATE PROFICIENCY IN MAGNETIC CONTROLLERS--The student will be able to:

07.01 Connect a standard start-stop pushbutton station to operate a magnetic motor starter.
07.02 Troubleshoot the control circuit and the power circuit.
07.03 Connect start-stop pushbutton stations to control magnetic starters.
07.04 Connect the STOP pushbutton through a logic relay for NOT, NOR, AND and NAND circuit logic.
07.05 Connect motors arranged for sequence control of a conveyor system.
07.06 Interconnect starters to control a conveyor system so as to prevent pile ups and assure safe operation.
07.07 Connect a motor using a selector switch and a jogging relay.

08.0 DEMONSTRATE PROFICIENCY IN PRESSURE AND STRAIN MEASUREMENTS--The student will be able to:

08.01 Connect a linear Hall sensor.
08.02 Apply amplification to the linear Hall sensor.
08.03 Connect a digital Hall sensor as a hysteresis type of load switch.
08.04 Connect a digital Hall sensor as a sensitive load cell.
08.05 Connect the AC response of the linear variable differential transformer (LVDT) to indicate mechanical position change.

09.0 DEMONSTRATE PROFICIENCY IN TEMPERATURE CONTROL--The student will be able to:

09.01 Connect a temperature module, calibrate the integrated circuit for reading temperature and measure the cold resistance of the thermistor.
09.02 Measure temperature by using a thermocouple mounted on an op-amp module.
09.03 Apply amplified voltage change at the op-amp output to operate a solid-state relay and an indicating device.
09.04 Use an op-amp, relay, lamp and temperature module to set up a system that maintains temperature at a constant level.
09.05 Connect a bridge, temperature module and thyristor module into a closed-loop temperature control system.
09.06 Connect a voltage-controlled oscillator module and determine the range of control voltage necessary for oscillation.
09.07 Connect a temperature and voltage-controlled oscillator module to provide digital readout of temperature.

10.0 DEMONSTRATE PROFICIENCY IN PHOTOELECTRIC CONTROL--The student will be able to:

10.01 Connect a photoconductive cell and incandescent lamp and measure the effect on photocell resistance.
10.02 Use a photo-Darlington transistor to receive light from an incandescent lamp and measure its effect on collector voltage with a change of light intensity.
10.03 Connect a photoelectric relay circuit to turn lights on and off.
10.04 Operate and adjust a fiber optic transmitter for minimum distortion.
10.05 Operate and adjust a fiber optic receiver for maximum sensitivity and minimum distortion.
10.06 Transmit a voice signal from a transmitter to a receiver through an optical cable.
10.07 Transmit digital data through an optical cable.

11.0 DEMONSTRATE PROFICIENCY IN GAS AND HUMIDITY SENSORS--The student will be able to:

11.01 Measure the resistance of a hygropak humidity sensor under varying conditions of humidity.
11.02 Simulate a wet and dry bulb humidity measurement device using a thermistor as the active element.
11.03 Connect a gas detector circuit using a Taguchi gas sensor and measure its cold and hot resistances.

11.04 Use a gas sensor as a smoke detector, coupled with a solid-state relay and lamp, to act as an indicator.

12.0 DEMONSTRATE PROFICIENCY IN LIQUID LEVEL CONTROLS--The student will be able to:

12.01 Connect a level switch to control a pump motor for sump operation.
12.02 Add a timer to a level control circuit to keep the pump motor running for a set time after the level has dropped.
12.03 Add a time to level control circuit to start a second pump motor if the first cannot lower the level after a given time.
12.04 Use the float switch control starter for tank operation.
12.05 Use the pump operating system to provide backspin and surge protection on stopping.

13.0 DEMONSTRATE A PROFICIENCY IN LINE DIAGRAMS AND LOGIC FUNCTIONS--The student will be able to:

13.01 Connect control switches for AND circuit logic.
13.02 Connect control switches for OR circuit logic.
13.03 Connect a control switch for NOT circuit logic.
13.04 Connect switches for NOR circuit logic.
13.05 Connect control switches for NAND circuit logic.
13.06 Connect a logic relay for OR circuit logic.
13.07 Connect a logic relay for AND circuit logic.
13.08 Connect a logic relay for NOR circuit logic.
13.09 Connect a logic relay for NAND circuit logic.
13.10 Connect a control relay in a circuit to add memory to the circuit.
13.11 Connect a logic relay together with a control relay to form a combination of memory with either OR or AND logic.

14.0 DEMONSTRATE PROFICIENCY IN TIMING SYSTEMS--The student will be able to:

14.01 Construct a time delay circuit using an RC network and a silicone controlled rectifier.
14.02 Adjust the time delay relay circuit for different time delays.
14.03 Use a frequency divider as a timing device to obtain different time delays.
14.04 Change the repetition rate of the signal applied to a frequency divider to obtain different time delays.
14.05 Combine the inputs and outputs of two frequency dividers to increase the total division and obtain time delays using a signal having a higher repetition rate.
14.06 Connect a time delay circuit using an integrated circuit and a solid-state relay and measure different time delays.
14.07 Connect a time delay circuit using an operational amplifier to keep a device turned off for a definite period of time.
14.08 Measure the frequency or repetition rate of a sine-wave or square-wave signal.
14.09 Change the function gate time and determine the readout on a digital counter.

14.10 Use the digital counter to measure low frequencies by measuring the period of a waveform or pulse.

15.0 DEMONSTRATE PROFICIENCY IN TIME DELAY CIRCUITS--The student will be able to:

15.01 Connect an on-delay timer to sequence start two motors.
15.02 Connect an on-delay timer to automatically turn off a second motor while the first remains on.
15.03 Connect an off-delay timer to keep a second motor running for a set period of time after the first is turned off.
15.04 Connect an off-delay timer used to prevent a motor from restarting until the time setting is past.
15.05 Connect an off-delay timer for deceleration control.
15.06 Connect a one-shot timer to keep a load turned on for a set period of time regardless of how long the switch-on control is closed.
15.07 Use a one-shot timer to turn on a second motor for a short period of time after the first motor is started.
15.08 Connect a recycle timer into a two-wire control circuit.
15.09 Connect a recycle timer into a three-wire control circuit.

16.0 DEMONSTRATE PROFICIENCY IN PROCESS CONTROL--The student will be able to:

16.01 Explain the operation of a two-position controller and its applications.
16.02 Describe the effects of widening the proportional band.
16.03 Evaluate a proportional circuit based on test data.
16.04 Describe the action of a backup control in a proportional circuit.
16.05 Describe the operation of a direct digital control in an industrial process.

17.0 DEMONSTRATE PROFICIENCY IN TELEMETRY--The student will be able to:

17.01 Connect a telemetry transmitter to a power supply and observe the carrier output waveform with and without modulation.
17.02 Measure the carrier frequency of a telemetry transmitter and observe the effects of modulation on the frequency.
17.03 Measure the input frequency of a telemetry receiver.
17.04 Measure the band-pass of a telemetry receiver.
17.05 Transmit a 200 Hz audio tone between two separate points using a telemetry transmitter and receiver.
17.06 Transmit an analog voltage between two separate points using a telemetry transmitter and receiver.
17.07 Transmit two separate information channels using a single carrier and time-division multiplexing.

18.0 DEMONSTRATE PROFICIENCY IN SYSTEMS INTERFACE--The student will be able to:

18.01 Construct a frequency shift keying (FSK) generator using frequency division.

18.02 Construct an FSK generator using a voltage-to-frequency converter.

18.03 Set up and adjust a phase-locked loop frequency-to-voltage converter.

18.04 Use a frequency-to-voltage converter to demodulate an FSK signal.

18.05 Set up and adjust a charge-pump frequency-to-voltage converter.

18.06 Verify the truth table of a BCD coded switch.

18.07 Verify the analog output voltage of a four-bit digital-to-analog converter.

18.08 Connect an analog-to-digital converter and observe ramp generation and counter operation.

18.09 Calibrate a binary-ramp analog-to-digital converter.

18.10 Generate binary numbers 0000 through 1111 and verify their analog equivalents.

18.11 Interface a four-bit digital signal with a heating element and observe its controlling effect.

18.12 Interface a four-bit digital signal with a light bulb and observe on-off control.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Industrial Foremanship and Supervision
Occupational Area:	Industrial Education
	PSAV
Program Numbers	I062001
CIP Number	0606.200100
Grade Level	30, 31
Length	1620 hours
Certification	SUPVR TRG @7 G
	IND ENGR @7 G
	HUMAN REL @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as an industrial supervisor (550.132-010), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, principles of management, planning and cost control, acquisition and retention of manpower, production processes, and quality control and reliability standards.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Industrial Foremanship and Supervision industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in those areas that are directly related to the occupational area for which the training is being offered.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has

chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 9.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1620 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Apply supervision skills.
02.0 Communicate effectively in supervision.
03.0 Manage human behavior.
04.0 Motivate one's self.
05.0 Motivate others.
06.0 Apply strategies for effective management.
07.0 Utilize creative thinking to achieve business objectives.
08.0 Apply basic decision making skills in supervision.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate appropriate math skills.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate employability skills.
13.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Industrial Foremanship And Supervision
Secondary Number:
Postsecondary Number: I062001

01.0 APPLY SUPERVISION SKILLS--The student will be able to:

- 01.01 Specify the responsibilities of the supervisor.
- 01.02 Practice human relations skills.
- 01.03 Follow leadership principles and approaches.
- 01.04 Apply positive approaches to discipline.
- 01.05 Conceptualize organizational functions of management.
- 01.06 Develop organizational plans.
- 01.07 Follow and teach accepted accident prevention practices.
- 01.08 Apply elements of delegation.
- 01.09 Coordinate employee and organization interest.
- 01.10 Apply techniques of dealing with crisis.
- 01.11 Utilize strategies for dealing with interpersonal conflicts.
- 01.12 Analyze causes of resistance in employees.
- 01.13 Implement the agreement finding process.
- 01.14 Develop and implement job instructions.
- 01.15 Apply delegation procedures.

02.0 COMMUNICATE EFFECTIVELY IN SUPERVISION--The student will be able to:

- 02.01 Solve problems in communicating.
- 02.02 Exhibit appropriate habits in person to person communication.
- 02.03 Apply listening skills.
- 02.04 Use communication feedback effectively.
- 02.05 Use persuasion skills in communicating.
- 02.06 Build credibility in management.
- 02.07 React to non-verbal communication.
- 02.08 Practice confrontation skills.

03.0 MANAGE HUMAN BEHAVIOR--The student will be able to:

- 03.01 Use behavior modification techniques.
- 03.02 Practice transactional analysis skills.
- 03.03 Establish goals and objectives.
- 03.04 Identify and resolve emotional disturbances of workers.
- 03.05 Use self concept building skills.
- 03.06 Assess worker and supervisor roles and relationships.
- 03.07 Manage worker resistance to change.
- 03.08 Diagnose the dynamics involved in performance appraisal.
- 03.09 Use appropriate assertiveness skills.

04.0 MOTIVATE ONE'S SELF--The student will be able to:

- 04.01 Build improved attitude and self-confidence.
- 04.02 Conceptualize cause and effect relationship.
- 04.03 Set personal goals.

04.04 Apply self-esteem building skills.
04.05 Diagnose life traps.
04.06 Apply self-discipline techniques.
04.07 Determine areas of personal talent.

05.0 MOTIVATE OTHERS--The student will be able to:

05.01 Conceptualize the self-fulling prophesy.
05.02 Conceptualize the process of motivation.
05.03 Apply the hierarchy of human needs to worker motivation.
05.04 Effect job enrichment procedures.
05.05 Apply attitude enrichment procedures.
05.06 Conceptualize concept of maintainers and motivators.
05.07 Develop role of trust and credibility in worker motivation.
05.08 Direct goal-setting procedures with workers.
05.09 Implement participative style of supervision.

06.0 APPLY STRATEGIES FOR EFFECTIVE MANAGEMENT--The student will be able to:

06.01 Diagnose unacceptable performance.
06.02 Determine effective discipline procedures.
06.03 Undertake disciplinary action.
06.04 Plan appraisal interviews.
06.05 Conduct appraisal interviews.
06.06 Implement transfer, demotion and termination procedures.
06.07 Conduct hiring interviews.
06.08 Implement recruitment procedures.

07.0 UTILIZE CREATIVE THINKING TO ACHIEVE BUSINESS OBJECTIVES--The student will be able to:

07.01 Conduct and apply techniques for maximum production of ideas.
07.02 Maintain conditions necessary for creative problem solving.
07.03 Diagnose conditions antithetical to creativity.
07.04 Oversee problem solving.

08.0 APPLY BASIC DECISION MAKING SKILLS IN SUPERVISION--The student will be able to:

08.01 Conduct decision making meetings.
08.02 Employ steps of effective decision making.
08.03 Maintain conditions for effective decision making.
08.04 Set goals and objectives.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.

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09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Identify documents which may be required when applying for a job interview.
12.04 Complete a job application form correctly.
12.05 Demonstrate competence in job interview techniques.
12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
12.07 Identify acceptable work habits.
12.08 Demonstrate knowledge of how to make appropriate job changes.
12.09 Demonstrate acceptable employee health habits.
12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.

13.05 Identify the necessary personal characteristics of a successful entrepreneur.

13.06 Identify the business skills needed to operate a small business efficiently and effectively.

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Florida Department of Education
CLUSTER CURRICULUM FRAMEWORK

Cluster Title: Industrial Machinery Maintenance Technology
Cluster Type: Job Preparatory
Occupational Area: Industrial Education

Components One Core, Two Programs, Four Occupational Completion Points

	Secondary	PSAV
Grade Level	9-12, 30, 31	30, 31
Facility Code	203	203
VSO	VICA	VICA
Co-op Method	Yes	Yes
Apprenticeship	Yes	Yes

I. **PURPOSE:** The purpose of the programs in this cluster is to prepare students for employment or advanced training in the industrial-machinery maintenance-technology industry. The programs in this cluster also provide supplemental training for persons previously or currently employed in the industrial-machinery maintenance-technology industry.

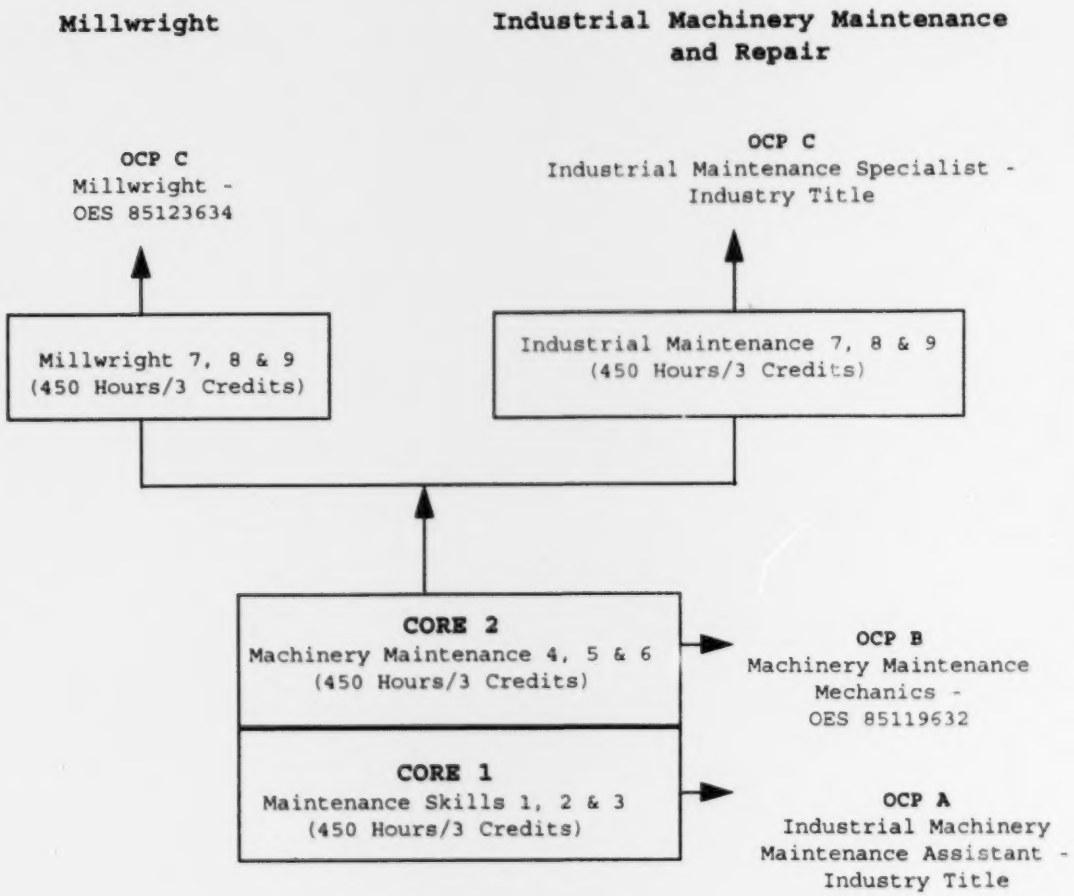
This cluster of programs focuses on broad, transferable skills, stresses the understanding of all aspects of the industrial-machinery maintenance-technology industry, and demonstrates elements of the industry such as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

II. PROGRAM STRUCTURE: This cluster is a planned sequence of instruction consisting of two programs with one common core and four occupational completion points. The recommended sequence allows students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training program or terminate as an occupational completer.

It is recommended that students complete the core or demonstrate a mastery of the student performance standards contained in the core before advancing to the course(s) in the next level of either of the two programs, Millwright or Industrial Machinery Maintenance and Repair Specialist.

The following diagram illustrates the clusture structure:

INDUSTRIAL MACHINERY MAINTENANCE TECHNOLOGY


Millwright
Industrial Machinery Maintenance and Repair
OCP C
Millwright - OES 85123634
OCP C
Industrial Maintenance Specialist - Industry Title
Millwright 7, 8 & 9 (450 Hours/3 Credits)
Industrial Maintenance 7, 8 & 9 (450 Hours/3 Credits)
CORE 2
Machinery Maintenance 4, 5 & 6 (450 Hours/3 Credits)
CORE 1
Maintenance Skills 1, 2 & 3 (450 Hours/3 Credits)
OCP B
Machinery Maintenance Mechanics - OES 85119632
OCP A
Industrial Machinery Maintenance Assistant - Industry Title

At the secondary level, the programs in this cluster consist of the following courses, which include the core:

MILLWRIGHT - 9 secondary credits
CORE
8743210 Maintenance Skills 1
8743220 Maintenance Skills 2
8743230 Maintenance Skills 3

MACHINERY MAINTENANCE
8743240 Machinery Maintenance 4
8743250 Machinery Maintenance 5
8743260 Machinery Maintenance 6

MILLWRIGHT
8743270 Millwright 7
8743280 Millwright 8
8743290 Millwright 9

INDUSTRIAL MACHINERY MAINTENANCE AND REPAIR - 9 secondary credits
CORE
8743210 Maintenance Skills 1
8743220 Maintenance Skills 2
8743230 Maintenance Skills 3

MACHINERY MAINTENANCE
8743240 Machinery Maintenance 4
8743250 Machinery Maintenance 5
8743260 Machinery Maintenance 6

INDUSTRIAL MACHINERY MAINTENANCE AND REPAIR
8743170 Industrial Machinery Maintenance and Repair 7
8743180 Industrial Machinery Maintenance and Repair 8
8743190 Industrial Machinery Maintenance and Repair 9

III. **LABORATORY ACTIVITIES:** Classroom, shop, and laboratory activities are an integral part of this cluster. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation.

IV. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., (VICA) is the appropriate vocational student organization (VSO) for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

Efficient and safe work practices are critical in this cluster of programs. For this reason, it may be useful to refer to the National Occupational Testing Institute for Machine Trades and Standards from the National Tooling and Machining Association, 9300 Livingston Road, Ft.

Washington, MD 20744. These standards are approved by the Metalworking Industry Skills Standards Board.

This cluster of programs prepares students for entry-level positions such as Industrial Machinery Maintenance Assistant (Industry Title), Machinery Maintenance Mechanic (OES 85110), Industrial Machinery Maintenance and Repair Specialist (Industry Title), and Millwright (OES 85123).

The programs in this cluster may be offered in postsecondary adult vocational (PSAV) courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The cooperative method of instruction is appropriate for this program. Whenever the cooperative method is offered, the following is required for each student: a training agreement, a training plan signed by the student, teacher and employer, including instructional objectives and a list of on-the-job and in-school learning experiences and a work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must be paid for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic-skills grade levels required for postsecondary adult vocational students to exit the programs in this cluster are listed before the intended outcomes for each program. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion of the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) or a remedial lab. Please refer to the Rule for exemptions.

When a secondary student with a disability is enrolled in a vocational class for which modifications to the curriculum framework have been made, the particular outcomes and student performance standards that the student must master to earn credit must be specified in the student's individual educational plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

SCANS Competencies: To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this cluster must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

July 1997

Florida Department of Education
INTENDED OUTCOMES

Program Title: **Millwright**

	Secondary	PSAV
Program Number:	**8743200**	**I470313**
CIP Number	0647.030302	0647.030302
Grade Level	9-12, 30, 31	30, 31
Length	9 Credits	1,350 Hours
Certification	TEC CONSTR @7 G	TEC CONSTR @7 G
	MILLWRIGHT @7 G	MILLWRIGHT @7 G
	BLDG CONST @7 G	BLDG CONST @7 G
	IND ENGR @7 G	IND ENGR @7 G

Basic-Skills Grade Level	
Math	9
Language	9
Reading	9

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Industrial Machinery Maintenance Assistant - Industry Title

01.0 Apply safety rules and procedures.
02.0 Explain the basic elements of physics as related to Industrial Machinery Maintenance and Repair.
03.0 Explain basic electricity and electronics.
04.0 Perform mathematical calculations.
05.0 Read plans and drawings.
06.0 Perform measuring and layout operations.
07.0 Perform computer applications.
08.0 Use and maintain hand tools.
09.0 Use and maintain portable power tools.
10.0 Handle and apply lubricants.
11.0 Perform benchwork skills.
12.0 Perform gas-welding and cutting operations.
13.0 Perform rigging functions.
14.0 Install and remove machinery.
15.0 Demonstrate conveyor-maintenance techniques.
16.0 Identify common troubles and basic troubleshooting techniques.
17.0 Demonstrate appropriate communication skills.
18.0 Demonstrate employability skills.
19.0 Describe the role of job ownership and entrepreneurship.
20.0 Apply customer-service skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Machinery Maintenance Mechanic - OES 85110

21.0 Plan an elementary predictive-preventive-maintenance (PPM) schedule.

22.0 Perform gas- and arc-welding procedures.
23.0 Perform machine-shop operations.
24.0 Maintain piping and tubing systems.
25.0 Troubleshoot electrical circuits.
26.0 Install and maintain drive components.
27.0 Maintain reciprocating, positive-displacement, and rotary air compressors.
28.0 Maintain and repair hydraulic-system components.
29.0 Troubleshoot hydraulic systems.
30.0 Maintain and troubleshoot pneumatic systems.
31.0 Maintain and troubleshoot fluid-drive systems.
32.0 Perform pump maintenance and repair.
33.0 Explain the operation of industrial-pollution control systems.
34.0 Troubleshoot air-conditioning and refrigeration systems .
35.0 Identify boilers .
36.0 Repair and maintain basic two-stroke-cycle engines .
37.0 Repair and maintain basic four-stroke-cycle engines .
38.0 Repair and maintain diesel engines .

OCCUPATIONAL COMPLETION POINT - DATA CODE C
Millwright - OES 85123634

39.0 Perform metal fabrication.
40.0 Perform precision layout.
41.0 Perform advanced rigging.
42.0 Install, remove, and align machinery.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Millwright
Secondary Number: 8743200
Postsecondary Number: I470313

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Industrial Machinery Maintenance Assistant - Industry Title

01.0 APPLY SAFETY RULES AND PROCEDURES--The student will be able to:

01.01 Practice shop safety rules and procedures.
01.02 Practice personal safety rules and procedures.
01.03 Practice fire safety rules and procedures.
01.04 Practice electrical safety rules and procedures.
01.05 Practice tool safety rules and procedures.
01.06 Practice ladder and scaffolding safety rules and procedures.
01.07 Maintain a clean work and shop area.
01.08 Perform lock out/tag-out procedures.
01.09 Identify Occupational Safety and Health Administration (OSHA) requirements and procedures.
01.10 Use Materials Safety Data Sheets (MSDS).

02.0 EXPLAIN THE BASIC ELEMENTS OF PHYSICS AS RELATED TO INDUSTRIAL MACHINERY MAINTENANCE AND REPAIR--The student will be able to:

02.01 Explain the standards of measurement and the impact of action and working forces, including tension, compression, torque, and shear.
02.02 Identify the principles and laws of motion and explain how they affect acceleration and deceleration.
02.03 Explain the relationship of work, power, and energy to the types of collisions and the conservation of momentum.
02.04 Explain the operation of simple machines, including the lever, inclined plane, screw, wedge, wheel and axle, pulley, and jacking screws.
02.05 Identify the ways of producing power for mechanical efficiency, in terms of gear ratios, work forces, and types of work done by a crane hook, forklift truck, and screw or bolt.
02.06 Use linear, liquid, and weight units of measurement to measure areas, areas within areas, and volume.
02.07 Describe the mechanical and chemical properties of materials commonly used in industry.
02.08 Explain the laws and conditions governing static and kinetic friction, the problems caused by friction, and the effects of the angle of repose.
02.09 Explain molecular action as a result of temperature extremes, chemical reaction, and moisture content.
02.10 Draw conclusions or make inferences from data.
02.11 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

02.12 Explain pressure measurement in terms of pounds per square inch (PSI), inches of mercury, and Kilopascal (KPa).

03.0 EXPLAIN BASIC ELECTRICITY AND ELECTRONICS--The student will be able to:

03.01 Define electrical/electronics terms.
03.02 Explain the theory and application of magnetism.
03.03 Explain Ohm's law.
03.04 Describe direct current (DC) and alternating current (AC) circuits.
03.05 Identify the advantages and disadvantages of alternating current (AC) and direct current (DC) motors for various applications.
03.06 Describe the use of programmable logic controllers (PLCs) in the industry.

04.0 PERFORM MATHEMATICAL CALCULATIONS--The student will be able to:

04.01 Make job-related decimal and fraction calculations.
04.02 Solve job-related problems by adding, subtracting, multiplying, and dividing numbers.
04.03 Solve job-related problems using a hand-held calculator.
04.04 Solve job-related problems using basic formulas.
04.05 Solve job-related problems using basic geometry.
04.06 Measure a workpiece and compare the measurements with blueprint specifications.
04.07 Solve job-related problems using mathematical handbooks, charts, and tables.
04.08 Convert measurements from English to metric and from metric to English units.
04.09 Solve job-related problems using proportions.
04.10 Solve job-related problems using statistics.

05.0 READ PLANS AND DRAWINGS--The student will be able to:

05.01 Identify dimensions.
05.02 Identify lists of materials and specifications.
05.03 Identify section and detail views.
05.04 Sketch and dimension a part.
05.05 Disassemble and assemble parts using an exploded-view drawing.
05.06 Interpret blueprint abbreviations.
05.07 Identify dimensioning of radii, round holes, fillets, and chamfers.
05.08 Identify screw threads and bolt types.
05.09 Apply dimensional tolerances.
05.10 Identify the metal-fabrication symbols used in blueprints.

06.0 PERFORM MEASURING AND LAYOUT OPERATIONS--The student will be able to:

06.01 Perform basic geometric-construction operations.
06.02 Safely use marking gauges, center punches, scribes, surface gauges, squares, dividers, dial indicators, protractors, surface plates, depth gauges, and circumference rules.

06.03 Develop patterns using parallel lines, radial lines, and triangulation.
06.04 Make metal-fabrication sketches.
06.05 Read and measure with steel rules.
06.06 Read and measure with micrometers.
06.07 Read and measure with vernier tools.
06.08 Read and measure with dial calipers.
06.09 Read and measure with dial indicators.

07.0 PERFORM COMPUTER APPLICATIONS--The student will be able to:

07.01 Explain the use of computers in plant operations.
07.02 Describe information processing.
07.03 Identify types of computers.
07.04 Identify keyboard functions.
07.05 Identify data input and output devices.
07.06 Describe computer programs.
07.07 Perform power-up and power-down procedures.
07.08 Back up data and save and print documents from a personal computer (PC).
07.09 Identify the effects of and the methods for checking for a virus in a PC system.

08.0 USE AND MAINTAIN HAND TOOLS--The student will be able to:

08.01 Demonstrate the safe use of hand tools: screwdrivers, hammers, wrenches, pliers, hacksaws, punches, chisels, drills, files, tin snips, taps, and dies.
08.02 Use measuring devices.
08.03 Use wrenches and screwdrivers.
08.04 Use pipefitting tools.
08.05 Use sheet-metal tools.
08.06 Safely use ropes, slings, pulleys, and block and tackle.
08.07 Select the proper tool for each job application.
08.08 Select correct tools for metric and standard fasteners.
08.09 Identify state-of-the-art innovations and explore their uses.
08.10 Identify and select fasteners for various applications, taking into account the effects of corrosion on each, including threaded fasteners, nuts, washers, rivets, locking pins, keys, self-tapping screws, locking-nut fasteners, and self-retaining nuts.
08.11 Describe the techniques and liability issues regarding retrofitting fasteners for ease of removal.

09.0 USE AND MAINTAIN PORTABLE POWER TOOLS--The student will be able to:

09.01 Demonstrate the safe use of portable power tools such as drills, belt and disc sanders, grinders, circular saws, saber saws, metal shears, electric and pneumatic impact wrenches, rotary and pneumatic chipping hammers, drill presses, and bench grinders.
09.02 Use and maintain light- and heavy-duty drills.
09.03 Use and maintain electric hammers.

09.04 Use and maintain pneumatic drills and hammers.
09.05 Use and maintain power screwdrivers and nut runners.
09.06 Use and maintain linear-motion saws.
09.07 Use and maintain circular saws.
09.08 Use and maintain belt, pad, and disc sanders.
09.09 Use and maintain grinders and shears.

10.0 HANDLE AND APPLY LUBRICANTS--The student will be able to:

10.01 Explain the functions of lubrication.
10.02 Explain the properties of oil lubricants and the factors determining the selection of lubricants.
10.03 Identify the types, advantages, and functions of lubricant additives.
10.04 Explain the types of circulating oils and their purposes.
10.05 Identify grease application.
10.06 Identify lubricating systems and methods.
10.07 Explain lubricant storage and handling methods.
10.08 Explain the types of oil filters and their uses.
10.09 Lubricate a piece of industrial equipment.
10.10 Define the role of preventive maintenance in total equipment maintenance.
10.11 Describe the major tasks of preventive maintenance: cleaning, inspection, lubrication, minor repair, and information feedback.
10.12 Review a typical maintenance program.

11.0 PERFORM BENCHWORK SKILLS--The student will be able to:

11.01 Identify safety and shop rules.
11.02 Cut materials by using hand hacksaws.
11.03 Cut threads by using hand taps.
11.04 Cut threads by using dies.
11.05 Repair threads by chasing and thread inserts.
11.06 Install dowel pins using tapered and straight reamers.
11.07 Ream holes by using tapered and straight reamers.
11.08 Hand-sharpen cutting tools by using abrasive stones.
11.09 Hone and lap surfaces.
11.10 Remove damaged screws and other hardware.
11.11 Deburr workpieces.

12.0 PERFORM GAS-WELDING AND CUTTING OPERATIONS--The student will be able to:

12.01 Identify the properties of the most commonly used metals and alloys, including hardness and malleability.
12.02 Identify the processes and effects of tempering, annealing, and case hardening.
12.03 Identify welding cylinders, regulators, hoses, pressure gauges, and torches.
12.04 Describe welding-equipment safety procedures.
12.05 Demonstrate proper flame settings.
12.06 Demonstrate basic gas-welding skills.
12.07 Demonstrate procedures for adjusting and operating the oxyacetylene cutting torch.

12.08 Demonstrate freehand and guide cutting of various metal thicknesses.
12.09 Identify the uses of the following welding techniques: laser, ultrasonic, resistance, and percussion.

13.0 PERFORM RIGGING FUNCTIONS--The student will be able to:

13.01 Demonstrate the safety procedures for performing rigging and lifting operations.
13.02 Identify and inspect fiber and wire rope.
13.03 Tie knots and hitches.
13.04 Identify and use the components of rigging hardware.
13.05 Perform rigging and lifting operations.
13.06 Demonstrate the proper operation of a forklift.

14.0 INSTALL AND REMOVE MACHINERY--The student will be able to:

14.01 Identify the safety procedures for installing and removing machinery.
14.02 Identify the equipment required for machine installation and removal.
14.03 Prepare an area for machine installation per the manufacturer's specifications.
14.04 Rig, lift, and transport machinery to the installation site.
14.05 Install electrical hookups to machinery.
14.06 Install air hydraulic hookups to machinery.
14.07 Perform an assigned machine retrofit per the manufacturer's specifications.
14.08 Perform an assigned machine removal and transport per specification requirements.
14.09 Explain the importance of vibration detection.

15.0 DEMONSTRATE CONVEYOR-MAINTENANCE TECHNIQUES--The student will be able to:

15.01 Identify the types of conveyors.
15.02 Identify the safety requirements and precautions for conveyor-maintenance operations.
15.03 Adjust the tracking of a belt.
15.04 Check a belt for wear.
15.05 Identify the types of splices.
15.06 Identify splicing equipment and procedures.
15.07 Demonstrate conveyor-maintenance techniques, including making splices with splicing equipment.

16.0 IDENTIFY COMMON TROUBLES AND BASIC TROUBLESHOOTING TECHNIQUES--The student will be able to:

16.01 Analyze the possible causes of common troubles in industrial-machinery performance.
16.02 Identify basic troubleshooting techniques for bearings.
16.03 Identify basic troubleshooting techniques for pumps.
16.04 Identify basic troubleshooting techniques for drive systems.

16.05 Identify basic troubleshooting techniques for electrical circuits.
16.06 Identify basic troubleshooting techniques for hydraulics.
16.07 Identify basic troubleshooting techniques for pneumatics.
16.08 Identify basic troubleshooting techniques for PLCs.

17.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

17.01 Write logical and understandable statements, or phrases, to accurately fill out forms and documents commonly used in business and industry.
17.02 Read and interpret graphs, charts, diagrams, and tables commonly used in business and industry.
17.03 Read and follow written and oral instructions.
17.04 Answer and ask questions coherently and concisely.
17.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
17.06 Demonstrate appropriate communication skills, including telecommunications.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct a job search.
18.02 Secure information about a job.
18.03 Identify the documents that may be required for a job application.
18.04 Complete a resume.
18.05 Complete a job-application form correctly.
18.06 Demonstrate competence in job-interview techniques.
18.07 Identify or demonstrate appropriate responses to criticism from an employer, a supervisor, or other persons.
18.08 Identify acceptable work habits.
18.09 Describe how to make appropriate job changes.
18.10 Demonstrate acceptable employee health habits.
18.11 Describe the purpose of the Florida "Right-to-Know" law, as recorded in the Florida Statutes, Chapter 442.

19.0 DESCRIBE THE ROLE OF JOB OWNERSHIP AND ENTREPRENEURSHIP--The student will be able to:

19.01 Define "entrepreneurship."
19.02 Describe the importance of entrepreneurship to the American economy.
19.03 List the advantages and disadvantages of business ownership and demonstrate ownership as an employee.
19.04 Identify the risks involved in the ownership of a business.
19.05 Identify the necessary personal characteristics and business skills of a successful entrepreneur.
19.06 Identify the need for teamwork, team roles when working in a factory or doing shift work, and team development.
19.07 Describe how attitudes toward work responsibilities, absences, and tardiness affect job success.

20.0 APPLY CUSTOMER-SERVICE SKILLS--The student will be able to:

20.01 Explain the need for customer satisfaction.
20.02 Prepare service orders properly.
20.03 Communicate solutions to customers.
20.04 Demonstrate methods of handling an irate customer.
20.05 Follow manufacturers' service manuals.
20.06 Locate parts in a printed or computerized catalog or on microfiche.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Machinery Maintenance Mechanic - OES 85110

21.0 PLAN AN ELEMENTARY PREDICTIVE-PREVENTIVE-MAINTENANCE (PPM) SCHEDULE--The student will be able to:

21.01 List the types of predictive-preventive maintenance.
21.02 Describe the purpose of preventive-maintenance schedules.
21.03 Create a preventive-maintenance schedule form using a machine manual or the manufacturer's recommendations.
21.04 Identify troubles caused by the lack of preventive maintenance.
21.05 Create a maintenance log and make entries for a machine or equipment.
21.06 Create a preventive-maintenance schedule from a maintenance-failures log.

22.0 PERFORM GAS- AND ARC-WELDING PROCEDURES--The student will be able to:

22.01 Demonstrate the safety procedures for performing gas and arc welding and for transporting equipment.
22.02 Identify the components of an oxyfuel rig.
22.03 Set up and shut down an oxyfuel rig.
22.04 Weld beads in a flat position.
22.05 Weld an outside corner joint using a filler rod.
22.06 Cut metal of various thicknesses.
22.07 Weld beads in a flat position using E-6010 and E-7018 electrodes.
22.08 Weld beads in horizontal and in vertical positions using E-6010 and E-7018 electrodes.
22.09 Weld beads in an overhead position using E-6010 and E-7018 electrodes.
22.10 Weld beads using a mig welder.
22.11 Weld beads using a tig welder.
22.12 Solder and braze metals.
22.13 Cut stainless steel and aluminum with a plasma-arc rig.

23.0 PERFORM MACHINE-SHOP OPERATIONS--The student will be able to:

23.01 Demonstrate safety in performing machine-shop operations.
23.02 Identify the types of cutting tools.
23.03 Bore a hole to a specified size.
23.04 Chase an external V-thread.
23.05 Identify the different types of work-holding devices.
23.06 Prepare metal for finishing.

23.07 Set up, use, and adjust an arbor press.
23.08 Set up, use, and adjust a hydraulic press.
23.09 Set up, use, and adjust broaching tools.
23.10 Cut keyways with an end mill.

24.0 MAINTAIN PIPING AND TUBING SYSTEMS--The student will be able to:

24.01 Identify the components of a piping system.
24.02 Explain the maintenance considerations of metallic and nonmetallic piping systems.
24.03 Describe the safety requirements for working with piping and tubing systems.
24.04 Join copper tubing.
24.05 Join common fittings.
24.06 Join metallic pipe.
24.07 Join plastic pipe.
24.08 Explain valve operation and maintenance.
24.09 Explain the importance of strainers, filters, and traps in piping systems.
24.10 Bend back-to-back, stub-ups, and doglegs in electrical metallic tubing (EMT).

25.0 TROUBLESHOOT ELECTRICAL CIRCUITS--The student will be able to:

25.01 Describe the safety requirements and precautions for troubleshooting electrical circuits.
25.02 Disconnect and reconnect electric motors.
25.03 Identify the parts and function of electrical control equipment.
25.04 Define digital devices and PLC logic/ladder logic to troubleshoot.
25.05 Identify the function of input and output devices and the controller.
25.06 Explain how to troubleshoot a sequence of events.
25.07 Use and maintain electrical test equipment for troubleshooting.

26.0 INSTALL AND MAINTAIN DRIVE COMPONENTS--The student will be able to:

26.01 Demonstrate safety procedures for installing and maintaining drive components.
26.02 Identify the types of bearings, their cross-referencing, and their uses.
26.03 Remove, inspect, and/or replace bearings.
26.04 Remove and replace seals.
26.05 Perform shaft alignment.
26.06 Identify the types of belts.
26.07 Identify the types of chains.
26.08 Perform tension adjustments and alignment on belt and chain drives.
26.09 Troubleshoot belt and chain drives.
26.10 Identify the types of gears.
26.11 Remove, replace, and align gears, sprockets, and couplings.
26.12 Remove, replace, or repair V-joints and jack shafts.
26.13 Adjust gear backlash.

26.14 Troubleshoot gear drives.
26.15 Disassemble, inspect, reassemble, and adjust clutches.
26.16 Identify the types of variable-speed drives.
26.17 Troubleshoot variable-speed drives.
26.18 Identify the types of cams and link mechanisms.
26.19 Troubleshoot cam-and-link mechanism problems.

27.0 MAINTAIN RECIPROCATING, POSITIVE-DISPLACEMENT, AND ROTARY AIR COMPRESSORS--The student will be able to:

27.01 Relate force, weight, mass, and density to a pneumatic system.
27.02 Demonstrate safety procedures for maintaining reciprocating, positive-displacement, and rotary air compressors.
27.03 Demonstrate the operation of reciprocating compressors.
27.04 Demonstrate the operation of positive-displacement and rotary air compressors.
27.05 Demonstrate primary and secondary air treatment.
27.06 Demonstrate the operation of valves, cylinders, and motors.
27.07 Check oil level.
27.08 Change oil.
27.09 Drain water from tank.
27.10 Test for efficiency of compressor.
27.11 Inspect storage tank for quality.
27.12 Test pressure control switch.

28.0 MAINTAIN AND REPAIR HYDRAULIC SYSTEM COMPONENTS--The student will be able to:

28.01 Explain the safety procedures for installing hydraulic lines.
28.02 Explain Pascal's law.
28.03 Explain Bernoulli's principle.
28.04 Explain how heat and pressure relate to power and transmission.
28.05 Describe the physical and chemical properties of a fluid.
28.06 Install and maintain a contaminant-removal system.
28.07 Determine reservoir requirements.
28.08 Classify and select pumps for specific applications.
28.09 Compute hose requirements.
28.10 Install hydraulic lines.
28.11 Select and install control valves.

29.0 TROUBLESHOOT HYDRAULIC SYSTEMS--The student will be able to:

29.01 Explain the safety procedures for troubleshooting hydraulic systems.
29.02 Read a hydraulic schematic.
29.03 Install hydraulic components.
29.04 Connect electrically controlled valves.
29.05 Explain hydraulic-system troubleshooting techniques.
29.06 Repair and replace valves.
29.07 Repair and replace cylinders.
29.08 Repair and replace pumps and motors.

30.0 MAINTAIN AND TROUBLESHOOT PNEUMATIC SYSTEMS--The student will be able to:

30.01 Explain the safety procedures for troubleshooting pneumatic systems.
30.02 Diagram an air-supply system.
30.03 Install system components.
30.04 Demonstrate system-maintenance techniques.
30.05 Explain proper troubleshooting procedures.
30.06 Troubleshoot air compressors.
30.07 Troubleshoot, repair, and install control valves.
30.08 Troubleshoot air motors.

31.0 MAINTAIN AND TROUBLESHOOT FLUID-DRIVE SYSTEMS--The student will be able to:

31.01 Explain the safety procedures for maintaining and troubleshooting fluid-drive systems.
31.02 Install adjustable speed drives.
31.03 Troubleshoot adjustable speed drives.
31.04 Explain the operation of fluid couplings.
31.05 Install fluid couplings.
31.06 Install torque converters.
31.07 Perform preventive maintenance.
31.08 Apply a "dynamic" magnetic/mechanical braking device to a motor.
31.09 Mount the equipment.

32.0 PERFORM PUMP MAINTENANCE AND REPAIR--The student will be able to:

32.01 Demonstrate the safety procedures for performing pump maintenance.
32.02 Determine pump capacity and system requirements.
32.03 Perform pump maintenance.
32.04 Identify packing and seal requirements.
32.05 Explain the operating principles of centrifugal, propeller and turbine rotary, reciprocating, diaphragm, positive-placement, and vacuum pumps.
32.06 Disassemble and reassemble a pump.

33.0 EXPLAIN THE OPERATION OF INDUSTRIAL-POLLUTION CONTROL SYSTEMS--The student will be able to:

33.01 Explain the operation of air-pollution control systems.
33.02 Explain the operation of water-pollution control systems.
33.03 Explain the operation of solid-vaste pollution control systems.
33.04 Explain the operation of noise-pollution control systems.

34.0 TROUBLESHOOT AIR-CONDITIONING AND REFRIGERATION SYSTEMS--The student will be able to:

34.01 Explain the principles of refrigeration.
34.02 Identify the major components.
34.03 Describe the functions of electrical systems.
34.04 Troubleshoot air-conditioning and refrigeration systems.

34.05 Explain the requirement for recovery of hazardous materials and related safety procedures.

35.0 IDENTIFY BOILERS--The student will be able to:

35.01 Identify the various types and components of heat exchangers.
35.02 Identify the various types and components of boilers.
35.03 Identify the various types and components of fractioning columns.
35.04 Identify the uses of steam.

36.0 REPAIR AND MAINTAIN BASIC TWO-STROKE-CYCLE ENGINES--The student will be able to:

36.01 Explain the basic principles of operation of the two-stroke-cycle combustion engine.
36.02 Identify the types of engines.
36.03 Locate engine serial and model numbers.
36.04 Identify engine assemblies and systems.
36.05 Disassemble engines.
36.06 Remove, clean, and inspect the head for cracks, warpage, and damaged spark-plug threads.
36.07 Diagnose head problems by use of the visual-inspection method.
36.08 Diagnose head problems by use of the compression-tester method.
36.09 Diagnose head problems by use of the cylinder air-pressure method.
36.10 Diagnose head problems by use of the stethoscope method.
36.11 Remove, clean, and inspect piston rods and assemblies.
36.12 Measure an out-of-round piston and cylinder.
36.13 Hone cylinders as required by the manufacturer's specifications.
36.14 Check the total bearing surface of connecting rod bearings.
36.15 Measure piston skirts and ring grooves.
36.16 Measure the piston-ring gap in the cylinder bore.
36.17 Install piston pins according to the manufacturer's specifications.
36.18 Check a rod-and-piston assembly alignment.
36.19 Install rings on pistons.
36.20 Install rod-and-piston assemblies.
36.21 Check needle bearings.
36.22 Measure and check crankshafts with a micrometer to diagnose engine problems.
36.23 Inspect crankshafts and install seals.
36.24 Inspect, clean, and/or replace reed valves.
36.25 Reassemble engines.

37.0 REPAIR AND MAINTAIN BASIC FOUR-STROKE-CYCLE ENGINES--The student will be able to:

37.01 Explain the basic principles of operation of the four-stroke-cycle internal-combustion engine.
37.02 Identify the types of four-stroke-cycle engines.
37.03 Locate engine serial and model numbers.
37.04 Identify engine assemblies and systems.

37.05 Diagnose valve and head problems by use of the visual-inspection method, i.e., water contamination v. fuel-rich or lean carburetor adjustment.
37.06 Diagnose valve and head problems by use of the compression-tester method.
37.07 Diagnose valve and head problems by use of the cylinder air-pressure method.
37.08 Diagnose valve and head problems by use of the stethoscope method.
37.09 Disassemble engines.
37.10 Clean and inspect heads for cracks, warpage, and damaged spark-plug threads.
37.11 Inspect valves for warpage, burns, cracks, stem wear, time wear, and margin.
37.12 Grind valve seats and reface valves.
37.13 Check and inspect springs for free height, distortion, and installed height.
37.14 Adjust a valve lash.
37.15 Remove and inspect camshafts and lifters.
37.16 Measure camshafts.
37.17 Service camshaft bearings.
37.18 Clean and inspect lifters for wear.
37.19 Time valve-drive assemblies.
37.20 Remove the piston from rod assemblies.
37.21 Measure piston out-of-round and cylinder taper with a dial bore gage or micrometer.
37.22 Check piston pins and bosses for wear.
37.23 Measure piston ring lands width, out-of-round, and taper.
37.24 Measure the piston-ring gap in the cylinder bore.
37.25 Install and fit piston pins.
37.26 Check the rod-and-piston assembly alignment.
37.27 Remove and replace rod bearings.
37.28 Hone and clean cylinders.
37.29 Install rings on pistons.
37.30 Measure and check crankshafts with a micrometer.
37.31 Check for end play.
37.32 Check the bearing bore with a telescoping gauge using special tools provided by the engine manufacturer.
37.33 Reassemble engines.
37.34 Install oil seals.

38.0 REPAIR AND MAINTAIN DIESEL ENGINES--The student will be able to:

38.01 Identify diesel-engine construction, the types of engines, and the principles of operation (two- and four-stroke).
38.02 Troubleshoot and repair cooling systems.
38.03 Troubleshoot and repair lubrication systems.
38.04 Troubleshoot and repair induction and exhaust systems.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
Millwright - OES 85123

39.0 PERFORM METAL FABRICATION--The student will be able to:

39.01 Field sketch equipment supports for applications in the millwright industry.
39.02 Read and interpret requirements in an OSHA 1910.211-219 and ANSI B15.1.
39.03 Create, design, draw, fabricate, and paint an OSHA-approved guard.
39.04 Use a Cut-A-Matic to make precision cuts.

40.0 PERFORM PRECISION LAYOUT--The student will be able to:

40.01 Locate an existing benchmark and transfer it to various positions around a work area or site.
40.02 Use the triangle procedure to check established benchmarks with an optical level and a transit.
40.03 Identify and establish center lines of equipment related to building columns.

41.0 PERFORM ADVANCED RIGGING--The student will be able to:

41.01 Perform and interpret all rigging hand signals.
41.02 Interpret and apply load charts for slings, chokers, and cables.
41.03 Determine the weight of a load.
41.04 Determine the method of lifting.
41.05 Identify crane capacity, including the boom angle and load-swing radius.
41.06 Identify and take the necessary precautions to accommodate weather conditions, load capacity, equipment, and safety factors.
41.07 Balance different types of loads.

42.0 INSTALL, REMOVE, AND ALIGN MACHINERY--The student will be able to:

42.01 Identify the equipment required for machine installation and removal in millwright applications.
42.02 Operate levers, inclined planes, screws, wedges, wheel and axle assemblies, pulleys, and jacking screws.
42.03 Perform site-clearance operations and demolition and salvage procedures.
42.04 Explain the principles of machine alignment.
42.05 Explain the principles of shaft alignment.
42.06 Explain the relationship of structural problems to misalignment.
42.07 Explain the use of thermal growth by calculation and field-growth techniques such as Essinger bars.
42.08 Align machinery using wire line, transit, dial indicators, a computer, and laser-alignment devices.
42.09 Perform laser horizontal and vertical alignment.
42.10 Perform the train alignment of three or more machines and graph the results.
42.11 Prepare an area for machine installation according to the manufacturer's specifications for selected applications.
42.12 Position and secure machinery on a foundation.
42.13 Level machinery and install balance-vibration dampeners.

42.14 Identify pipe-stress standards for millwright applications.
42.15 Perform finish alignment and check for pipe stresses in millwright applications.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743210
Course Title: Maintenance Skills 1
Course Credit: 1

COURSE DESCRIPTION:

This course develops the competencies of applying safety rules and procedures, relating the basic elements of physics and of electricity and electronics to Industrial Machinery Maintenance and Repair, performing mathematical calculations, reading plans and drawings, performing measuring and layout operations, and performing computer applications in the industrial-machinery maintenance-technology industry. There is no occupational completion point associated with the completion of this course.

01.0 APPLY SAFETY RULES AND PROCEDURES--The student will be able to:

01.01 Practice shop safety rules and procedures.
01.02 Practice personal safety rules and procedures.
01.03 Practice fire safety rules and procedures.
01.04 Practice electrical safety rules and procedures.
01.05 Practice tool safety rules and procedures.
01.06 Practice ladder and scaffolding safety rules and procedures.
01.07 Maintain a clean work and shop area.
01.08 Perform tag lockout procedures.
01.09 Identify Occupational Safety and Health Administration (OSHA) requirements and procedures.
01.10 Use Materials Safety Data Sheets (MSDS).

02.0 EXPLAIN THE BASIC ELEMENTS OF PHYSICS AS RELATED TO INDUSTRIAL MACHINERY MAINTENANCE AND REPAIR--The student will be able to:

02.01 Explain the standards of measurement and the impact of action and working forces, including tension, compression, torque, and shear.
02.02 Identify the principles and laws of motion and explain how they affect acceleration and deceleration.
02.03 Explain the relationship of work, power, and energy to the types of collisions and the conservation of momentum.
02.04 Explain the operation of simple machines, including the lever, inclined plane, screw, wedge, wheel and axle, pulley, and jacking screws.
02.05 Identify the ways of producing power for mechanical efficiency, in terms of gear ratios, work forces, and types of work done by a crane hook, forklift truck, and screw or bolt.
02.06 Use linear, liquid, and weight units of measurement to measure areas, areas within areas, and volume.
02.07 Describe the mechanical and chemical properties of materials commonly used in industry.

02.08 Explain the laws and conditions governing static and kinetic friction, the problems caused by friction, and the effects of the angle of repose.

02.09 Explain molecular action as a result of temperature extremes, chemical reaction, and moisture content.

02.10 Draw conclusions or make inferences from data.

02.11 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

02.12 Explain pressure measurement in terms of pounds per square inch (PSI), inches of mercury, and Kilopascal (KPa).

03.0 EXPLAIN BASIC ELECTRICITY AND ELECTRONICS--The student will be able to:

03.01 Define electrical/electronics terms.

03.02 Explain the theory and application of magnetism.

03.03 Explain Ohm's law.

03.04 Describe direct current (DC) and alternating current (AC) circuits.

03.05 Identify the advantages and disadvantages of alternating current (AC) and direct current (DC) motors for various applications.

03.06 Describe the use of programmable logic controllers (PLCs) in industry.

04.0 PERFORM MATHEMATICAL CALCULATIONS--The student will be able to:

04.01 Make job-related decimal and fraction calculations.

04.02 Solve job-related problems by adding, subtracting, multiplying, and dividing numbers.

04.03 Solve job-related problems using a hand-held calculator.

04.04 Solve job-related problems using basic formulas.

04.05 Solve job-related problems using basic geometry.

04.06 Measure a workpiece and compare the measurements with blueprint specifications.

04.07 Solve job-related problems using mathematical handbooks, charts, and tables.

04.08 Convert measurements from English to metric and from metric to English units.

04.09 Solve job-related problems using proportions.

04.10 Solve job-related problems using statistics.

05.0 READ PLANS AND DRAWINGS--The student will be able to:

05.01 Identify dimensions.

05.02 Identify lists of materials and specifications.

05.03 Identify section and detail views.

05.04 Sketch and dimension a part.

05.05 Disassemble and assemble parts using an exploded-view drawing.

05.06 Interpret blueprint abbreviations.

05.07 Identify dimensioning of radii, round holes, fillets, and chamfers.

05.08 Identify screw threads and bolt types.

05.09 Apply dimensional tolerances.

05.10 Identify the metal-fabrication symbols used in blueprints.

06.0 PERFORM MEASURING AND LAYOUT OPERATIONS--The student will be able to:

06.01 Perform basic geometric-construction operations.
06.02 Safely use marking gauges, center punches, scribes, surface gauges, squares, dividers, dial indicators, protractors, surface plates, depth gauges, and circumference rules.
06.03 Develop patterns using parallel lines, radial lines, and triangulation.
06.04 Make metal-fabrication sketches.
06.05 Read and measure with steel rules.
06.06 Read and measure with micrometers.
06.07 Read and measure with vernier tools.
06.08 Read and measure with dial calipers.
06.09 Read and measure with dial indicators.

07.0 PERFORM COMPUTER APPLICATIONS--The student will be able to:

07.01 Explain the use of computers in plant operations.
07.02 Describe information processing.
07.03 Identify types of computers.
07.04 Identify keyboard functions.
07.05 Identify data input and output devices.
07.06 Describe computer programs.
07.07 Perform power-up and power-down procedures.
07.08 Back up data and save and print documents from a personal computer (PC).
07.09 Identify the effects of and the methods for checking for a virus in a PC system.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743220
Course Title: Maintenance Skills 2
Course Credit: 1

COURSE DESCRIPTION:

This course develops the competencies of using and maintaining hand and portable power tools, handling and applying lubricants, applying basic benchwork skills, and performing basic gas-welding and cutting operations in the industrial-machinery maintenance-technology industry. There is no occupational completion point associated with the completion of this course.

08.0 USE AND MAINTAIN HAND TOOLS--The student will be able to:

- 08.01 Demonstrate the safe use of hand tools such as screwdrivers, hammers, wrenches, pliers, hacksaws, punches, chisels, drills, files, tin snips, taps, and dies.
- 08.02 Use measuring devices.
- 08.03 Use wrenches and screwdrivers.
- 08.04 Use pipefitting tools.
- 08.05 Use sheet-metal tools.
- 08.06 Safely use ropes, slings, pulleys, and block and tackle.
- 08.07 Select the proper tool for each job application.
- 08.08 Select correct tools for metric and standard fasteners.
- 08.09 Identify state-of-the-art innovations and explore their uses.
- 08.10 Identify and select fasteners for various applications, taking into account the effects of corrosion on each, including threaded fasteners, nuts, washers, rivets, locking pins, keys, self-tapping screws, locking-nut fasteners, and self-retaining nuts.
- 08.11 Describe the techniques and liability issues regarding retrofitting fasteners for ease of removal.

09.0 USE AND MAINTAIN PORTABLE POWER TOOLS--The student will be able to:

- 09.01 Demonstrate the safe use of portable power tools such as drills, belt and disc sanders, grinders, circular saws, saber saws, metal shears, electric and pneumatic impact wrenches, rotary and pneumatic chipping hammers, drill presses, and bench grinders.
- 09.02 Use and maintain light- and heavy-duty drills.
- 09.03 Use and maintain electric hammers.
- 09.04 Use and maintain pneumatic drills and hammers.
- 09.05 Use and maintain power screwdrivers and nut runners.
- 09.06 Use and maintain linear-motion saws.
- 09.07 Use and maintain circular saws.
- 09.08 Use and maintain belt, pad, and disc sanders.
- 09.09 Use and maintain grinders and shears.

10.0 HANDLE AND APPLY LUBRICANTS--The student will be able to:

10.01 Explain the functions of lubrication.
10.02 Explain the properties of oil lubricants and the factors determining the selection of lubricants.
10.03 Identify the types, advantages, and functions of lubricant additives.
10.04 Explain the types of circulating oils and their purposes.
10.05 Identify grease application.
10.06 Identify lubricating systems and methods.
10.07 Explain lubricant storage and handling methods.
10.08 Explain the types of oil filters and their uses.
10.09 Lubricate a piece of industrial equipment.
10.10 Define the role of preventive maintenance in total equipment maintenance.
10.11 Describe the major tasks of preventive maintenance: cleaning, inspection, lubrication, minor repair, and information feedback.
10.12 Review a typical maintenance program.

11.0 PERFORM BENCHWORK SKILLS--The student will be able to:

11.01 Identify safety and shop rules.
11.02 Cut materials by using hand hacksaws.
11.03 Cut threads by using hand taps.
11.04 Cut threads by using dies.
11.05 Repair threads by chasing and thread inserts.
11.06 Install dowel pins using tapered and straight reamers.
11.07 Ream holes by using tapered and straight reamers.
11.08 Hand-sharpen cutting tools by using abrasive stones.
11.09 Hone and lap surfaces.
11.10 Remove damaged screws and other hardware.
11.11 Deburr workpieces.

12.0 PERFORM GAS-WELDING AND CUTTING OPERATIONS--The student will be able to:

12.01 Identify the properties of the most commonly used metals and alloys, including hardness and malleability.
12.02 Identify the processes and effects of tempering, annealing, and case hardening.
12.03 Identify welding cylinders, regulators, hoses, pressure gauges, and torches.
12.04 Describe welding-equipment safety procedures.
12.05 Demonstrate proper flame settings.
12.06 Demonstrate basic gas-welding skills.
12.07 Demonstrate procedures for adjusting and operating the oxyacetylene cutting torch.
12.08 Demonstrate freehand and guide cutting of various metal thicknesses.
12.09 Identify the uses of the following welding techniques: laser, ultrasonic, resistance, and percussion.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743230
Course Title: Maintenance Skills 3
Course Credit: 1

COURSE DESCRIPTION:

This course develops competencies in rigging and lifting, installing and removing machinery, conveyor maintenance, troubleshooting machinery performance, communicating, servicing customers, obtaining employment, and entrepreneurship skills in the industrial-machinery maintenance-technology industry. Completion of this course prepares the student for ***OCCUPATIONAL COMPLETION POINT - DATA CODE A, INDUSTRIAL MACHINERY MAINTENANCE*** Assistant--Industry Title.

13.0 PERFORM RIGGING FUNCTIONS--The student will be able to:

- 13.01 Demonstrate the safety procedures for performing rigging and lifting operations.
- 13.02 Identify and inspect fiber and wire rope.
- 13.03 Tie knots and hitches.
- 13.04 Identify and use the components of rigging hardware.
- 13.05 Perform rigging and lifting operations.
- 13.06 Demonstrate the proper operation of a forklift.

14.0 INSTALL AND REMOVE MACHINERY--The student will be able to:

- 14.01 Identify the safety procedures for installing and removing machinery.
- 14.02 Identify the equipment required for machine installation and removal.
- 14.03 Prepare an area for machine installation per the manufacturer's specifications.
- 14.04 Rig, lift, and transport machinery to the installation site.
- 14.05 Install electrical hookups to machinery.
- 14.06 Install air hydraulic hookups to machinery.
- 14.07 Perform an assigned machine retrofit per manufacturer's specifications.
- 14.08 Perform an assigned machine removal and transport per specification requirements.
- 14.09 Explain the importance of vibration detection.

15.0 DEMONSTRATE CONVEYOR-MAINTENANCE TECHNIQUES--The student will be able to:

- 15.01 Identify the types of conveyors.
- 15.02 Identify the safety requirements and precautions for conveyor-maintenance operations.
- 15.03 Adjust the tracking of a belt.
- 15.04 Check a belt for wear.

15.05 Identify the types of splices.
15.06 Identify splicing equipment and procedures.
15.07 Demonstrate conveyor-maintenance techniques, including making splices with splicing equipment.

16.0 IDENTIFY COMMON TROUBLES AND BASIC TROUBLESHOOTING TECHNIQUES--The student will be able to:

16.01 Analyze the possible causes of common troubles in industrial-machinery performance.
16.02 Identify basic troubleshooting techniques for bearings.
16.03 Identify basic troubleshooting techniques for pumps.
16.04 Identify basic troubleshooting techniques for drive systems.
16.05 Identify basic troubleshooting techniques for electrical circuits.
16.06 Identify basic troubleshooting techniques for hydraulics.
16.07 Identify basic troubleshooting techniques for pneumatics.
16.08 Identify basic troubleshooting techniques for PLCs.

17.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

17.01 Write logical and understandable statements, or phrases, to accurately fill out forms and documents commonly used in business and industry.
17.02 Read and interpret graphs, charts, diagrams, and tables commonly used in business and industry.
17.03 Read and follow written and oral instructions.
17.04 Answer and ask questions coherently and concisely.
17.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
17.06 Demonstrate appropriate communication skills, including telecommunications.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct a job search.
18.02 Secure information about a job.
18.03 Identify the documents that may be required for a job application.
18.04 Complete a resume.
18.05 Complete a job-application form correctly.
18.06 Demonstrate competence in job-interview techniques.
18.07 Identify or demonstrate appropriate responses to criticism from an employer, a supervisor, or other persons.
18.08 Identify acceptable work habits.
18.09 Describe how to make appropriate job changes.
18.10 Demonstrate acceptable employee health habits.
18.11 Describe the purpose of the Florida "Right-to-Know" law, as recorded in the Florida Statutes, Chapter 442.

19.0 DESCRIBE THE ROLE OF JOB OWNERSHIP AND ENTREPRENEURSHIP--The student will be able to:

19.01 Define "entrepreneurship."
19.02 Describe the importance of entrepreneurship to the American economy.
19.03 List the advantages and disadvantages of business ownership and demonstrate ownership as an employee.
19.04 Identify the risks involved in the ownership of a business.
19.05 Identify the necessary personal characteristics and business skills of a successful entrepreneur.
19.06 Identify the need for teamwork, team roles when working in a factory or doing shift work, and team development.
19.07 Describe how attitudes toward work responsibilities, absences, and tardiness affect job success.

20.0 APPLY CUSTOMER-SERVICE SKILLS--The student will be able to:

20.01 Explain the need for customer satisfaction.
20.02 Prepare service orders properly.
20.03 Communicate solutions to customers.
20.04 Demonstrate methods of handling an irate customer.
20.05 Follow manufacturers' service manuals.
20.06 Locate parts in a printed or computerized catalog or on microfiche.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743240
Course Title: Machinery Maintenance 4
Course Credit: 1

COURSE DESCRIPTION:

This course develops the competencies of planning an elementary predictive- preventive-maintenance schedule, performing gas and arc welding, performing machine-shop operations, maintaining piping and tubing systems, troubleshooting electrical circuits, and maintaining and installing drive components in the industrial-machinery maintenance-technology industry. There is no occupational completion point associated with the completion of this course.

21.0 PLAN AN ELEMENTARY PREDICTIVE-PREVENTIVE-MAINTENANCE (PPM) SCHEDULE--The student will be able to:

21.01 List the types of predictive-preventive maintenance.
21.02 Describe the purpose of preventive-maintenance schedules.
21.03 Create a preventive-maintenance schedule form using a machine manual or the manufacturer's recommendations.
21.04 Identify troubles caused by the lack of preventive maintenance.
21.05 Create a maintenance log and make entries for a machine or equipment.
21.06 Create a preventive-maintenance schedule from a maintenance-failures log.

22.0 PERFORM GAS- AND ARC-WELDING PROCEDURES--The student will be able to:

22.01 Demonstrate the safety procedures for performing gas and arc welding and for transporting equipment.
22.02 Identify the components of an oxyfuel rig.
22.03 Set up and shut down an oxyfuel rig.
22.04 Weld beads in a flat position.
22.05 Weld an outside corner joint using a filler rod.
22.06 Cut metal of various thicknesses.
22.07 Weld beads in a flat position using E-6010 and E-7018 electrodes.
22.08 Weld beads in horizontal and in vertical positions using E-6010 and E-7018 electrodes.
22.09 Weld beads in an overhead position using E-6010 and E-7018 electrodes.
22.10 Weld beads using a mig welder.
22.11 Weld beads using a tig welder.
22.12 Solder and braze metals.
22.13 Cut stainless steel and aluminum with a plasma-arc rig.

23.0 PERFORM MACHINE-SHOP OPERATIONS--The student will be able to:

23.01 Demonstrate safety in performing machine-shop operations.
23.02 Identify the types of cutting tools.
23.03 Bore a hole to a specified size.
23.04 Chase an external V-thread.
23.05 Identify the different types of work-holding devices.
23.06 Prepare metal for finishing.
23.07 Set up, use, and adjust an arbor press.
23.08 Set up, use, and adjust a hydraulic press.
23.09 Set up, use, and adjust broaching tools.
23.10 Cut keyways with an end mill.

24.0 MAINTAIN PIPING AND TUBING SYSTEMS--The student will be able to:

24.01 Identify the components of a piping system.
24.02 Explain the maintenance considerations of metallic and nonmetallic piping systems.
24.03 Describe the safety requirements for working with piping and tubing systems.
24.04 Join copper tubing.
24.05 Join common fittings.
24.06 Join metallic pipe.
24.07 Join plastic pipe.
24.08 Explain valve operation and maintenance.
24.09 Explain the importance of strainers, filters, and traps in piping systems.
24.10 Bend back-to-back, stub-ups, and doglegs in electrical metallic tubing (EMT).

25.0 TROUBLESHOOT ELECTRICAL CIRCUITS--The student will be able to:

25.01 Describe the safety requirements and precautions for troubleshooting electrical circuits.
25.02 Disconnect and reconnect electric motors.
25.03 Identify the parts and function of electrical control equipment.
25.04 Define digital devices and PLC logic/ladder logic to troubleshoot.
25.05 Identify the function of input and output devices and the controller.
25.06 Explain how to troubleshoot a sequence of events.
25.07 Use and maintain electrical test equipment for troubleshooting.

26.0 INSTALL AND MAINTAIN DRIVE COMPONENTS--The student will be able to:

26.01 Demonstrate safety procedures for installing and maintaining drive components.
26.02 Identify types of bearings, their cross-referencing, and their uses.
26.03 Remove, inspect, and/or replace bearings.
26.04 Remove and replace seals.
26.05 Perform shaft alignment.
26.06 Identify the types of belts.
26.07 Identify the types of chains.

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26.08 Perform tension adjustments and alignment on belt and chain drives.
26.09 Troubleshoot belt and chain drives.
26.10 Identify the types of gears.
26.11 Remove, replace, and align gears, sprockets, and couplings.
26.12 Remove, replace, or repair V-joints and jack shafts.
26.13 Adjust gear backlash.
26.14 Troubleshoot gear drives.
26.15 Disassemble, inspect, reassemble, and adjust clutches.
26.16 Identify the types of variable-speed drives.
26.17 Troubleshoot variable-speed drives.
26.18 Identify the types of cams and link mechanisms.
26.19 Troubleshoot cam-and-link mechanism problems.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743250
Course Title: Machinery Maintenance 5
Course Credit: 1

COURSE DESCRIPTION:

This course develops the competencies of maintaining specific types of air compressors and maintaining, repairing, and troubleshooting fluid-drive systems in the industrial-machinery maintenance-technology industry. There is no occupational completion point associated with the completion of this course.

27.0 MAINTAIN RECIPROCATING, POSITIVE-DISPLACEMENT, AND ROTARY AIR COMPRESSORS--The student will be able to:

27.01 Relate force, weight, mass, and density to a pneumatic system.
27.02 Demonstrate safety procedures for maintaining reciprocating, positive-displacement, and rotary air compressors.
27.03 Demonstrate the operation of reciprocating compressors.
27.04 Demonstrate the operation of positive-displacement and rotary air compressors.
27.05 Demonstrate primary and secondary air treatment.
27.06 Demonstrate the operation of valves, cylinders, and motors.
27.07 Check oil level.
27.08 Change oil.
27.09 Drain water from tank.
27.10 Test for efficiency of compressor.
27.11 Inspect storage tank for quality.
27.12 Test pressure control switch.

28.0 MAINTAIN AND REPAIR HYDRAULIC-SYSTEM COMPONENTS--The student will be able to:

28.01 Explain the safety procedures for installing hydraulic lines.
28.02 Explain Pascal's law.
28.03 Explain Bernoulli's principle.
28.04 Explain how heat and pressure relate to power and transmission.
28.05 Describe the physical and chemical properties of a fluid.
28.06 Install and maintain a contaminant-removal system.
28.07 Determine reservoir requirements.
28.08 Classify and select pumps for specific applications.
28.09 Compute hose requirements.
28.10 Install hydraulic lines.
28.11 Select and install control valves.

29.0 TROUBLESHOOT HYDRAULIC SYSTEMS--The student will be able to:

29.01 Explain the safety procedures for troubleshooting hydraulic systems.

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29.02 Read a hydraulic schematic.
29.03 Install hydraulic components.
29.04 Connect electrically controlled valves.
29.05 Explain hydraulic-system troubleshooting techniques.
29.06 Repair and replace valves.

29.07 Repair and replace cylinders.
29.08 Repair and replace pumps and motors.

30.0 MAINTAIN AND TROUBLESHOOT PNEUMATIC SYSTEMS--The student will be able to:

30.01 Explain the safety procedures for troubleshooting pneumatic systems.
30.02 Diagram an air-supply system.
30.03 Install system components.
30.04 Demonstrate system-maintenance techniques.
30.05 Explain proper troubleshooting procedures.
30.06 Troubleshoot air compressors.
30.07 Troubleshoot, repair, and install control valves.
30.08 Troubleshoot air motors.

31.0 MAINTAIN AND TROUBLESHOOT FLUID-DRIVE SYSTEMS--The student will be able to:

31.01 Explain the safety procedures for maintaining and troubleshooting fluid-drive systems.
31.02 Install adjustable speed drives.
31.03 Troubleshoot adjustable speed drives.
31.04 Explain the operation of fluid couplings.
31.05 Install fluid couplings.
31.06 Install torque converters.
31.07 Perform preventive maintenance.
31.08 Apply a "dynamic" magnetic/mechanical braking device to a motor.
31.09 Mount the equipment.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743260
Course Title: Machinery Maintenance 6
Course Credit: 1

COURSE DESCRIPTION:

This course develops the competencies for pump maintenance and repair and for pollution control along with a knowledge of industrial-pollution control systems in industrial-machinery maintenance-technology operations. It may include the development of optional competencies related to air-conditioning and refrigeration, boilers, and small engines. Completion of this course prepares the student for ***OCCUPATIONAL COMPLETION POINT - DATA CODE B, MACHINERY MAINTENANCE MECHANIC--OES 85119632.***

32.0 PERFORM PUMP MAINTENANCE AND REPAIR--The student will be able to:

- 32.01 Demonstrate the safety procedures for performing pump maintenance.
- 32.02 Determine pump capacity and system requirements.
- 32.03 Perform pump maintenance.
- 32.04 Identify packing and seal requirements.
- 32.05 Explain the operating principles of centrifugal, propeller and turbine rotary, reciprocating, diaphragm, positive placement, and vacuum pumps.
- 32.06 Disassemble and reassemble a pump.

33.0 EXPLAIN THE OPERATION OF INDUSTRIAL-POLLUTION CONTROL SYSTEMS--The student will be able to:

- 33.01 Explain the operation of air-pollution control systems.
- 33.02 Explain the operation of water-pollution control systems.
- 33.03 Explain the operation of solid-waste pollution control systems.
- 33.04 Explain the operation of noise-pollution control systems.

34.0 TROUBLESHOOT AIR-CONDITIONING AND REFRIGERATION SYSTEMS--The student will be able to:

- 34.01 Explain the principles of refrigeration.
- 34.02 Identify the major components.
- 34.03 Describe the functions of electrical systems.
- 34.04 Troubleshoot air-conditioning and refrigeration systems.
- 34.05 Explain the requirement for recovery of hazardous materials and related safety procedures.

35.0 IDENTIFY BOILERS--The student will be able to:

- 35.01 Identify the various types and components of heat exchangers.
- 35.02 Identify the various types and components of boilers.

35.03 Identify the various types and components of fractioning columns.
35.04 Identify the uses of steam.

36.0 REPAIR AND MAINTAIN BASIC TWO-STROKE-CYCLE ENGINES--The student will be able to:

36.01 Explain the basic principles of operation of the two-stroke-cycle combustion engine.
36.02 Identify the types of engines.
36.03 Locate engine serial and model numbers.
36.04 Identify engine assemblies and systems.
36.05 Disassemble engines.
36.06 Remove, clean, and inspect the head for cracks, warpage, and damaged spark-plug threads.
36.07 Diagnose head problems by use of the visual-inspection method.
36.08 Diagnose head problems by use of the compression-tester method.
36.09 Diagnose head problems by use of the cylinder air-pressure method.
36.10 Diagnose head problems by use of the stethoscope method.
36.11 Remove, clean, and inspect piston rods and assemblies.
36.12 Measure an out-of-round piston and cylinder.
36.13 Hone cylinders as required by the manufacturer's specifications.
36.14 Check the total bearing surface of connecting rod bearings.
36.15 Measure piston skirts and ring grooves.
36.16 Measure the piston-ring gap in the cylinder bore.
36.17 Install piston pins according to the manufacturer's specifications.
36.18 Check the rod-and-piston assembly alignment.
36.19 Install rings on pistons.
36.20 Install rod-and-piston assemblies.
36.21 Check needle bearings.
36.22 Measure and check crankshafts with a micrometer to diagnose engine problems.
36.23 Inspect crankshafts and install seals.
36.24 Inspect, clean, and/or replace reed valves.
36.25 Reassemble engines.

37.0 REPAIR AND MAINTAIN BASIC FOUR-STROKE-CYCLE ENGINES--The student will be able to:

37.01 Explain the basic principles of operation of the four-stroke-cycle internal-combustion engine.
37.02 Identify the types of four-stroke-cycle engines.
37.03 Locate engine serial and model numbers.
37.04 Identify engine assemblies and systems.
37.05 Diagnose valve and head problems by use of the visual-inspection method, i.e., water contamination v. fuel-rich or lean carburetor adjustment.
37.06 Diagnose valve and head problems by use of the compression-tester method.
37.07 Diagnose valve and head problems by use of the cylinder air-pressure method.

37.08 Diagnose valve and head problems by use of the stethoscope method.
37.09 Disassemble engines.
37.10 Clean and inspect heads for cracks, warpage, and damaged spark-plug threads.
37.11 Inspect valves for warpage, burns, cracks, stem wear, time wear, and margin.
37.12 Grind valve seats and reface valves.
37.13 Check and inspect springs for free height, distortion, and installed height.
37.14 Adjust a valve lash.
37.15 Remove and inspect camshafts and lifters.
37.16 Measure camshafts.
37.17 Service camshaft bearings.
37.18 Clean and inspect lifters for wear.
37.19 Time valve-drive assemblies.
37.20 Remove the piston from rod assemblies.
37.21 Measure piston out-of-round and cylinder taper with a dial bore gauge or micrometer.
37.22 Check piston pins and bosses for wear.
37.23 Measure piston ring lands width, out-of-round, and taper.
37.24 Measure the piston-ring gap in the cylinder bore.
37.25 Install and fit piston pins.
37.26 Check the rod-and-piston assembly alignment.
37.27 Remove and replace rod bearings.
37.28 Hone and clean cylinders.
37.29 Install rings on pistons.
37.30 Measure and check crankshafts with a micrometer.
37.31 Check for end play.
37.32 Check the bearing bore with a telescoping gauge using special tools provided by the engine manufacturer.
37.33 Reassemble engines.
37.34 Install oil seals.

38.0 REPAIR AND MAINTAIN DIESEL ENGINES--The student will be able to:

38.01 Identify diesel-engine construction, the types of engines, and the principles of operation (two- and four-stroke).
38.02 Troubleshoot and repair cooling systems.
38.03 Troubleshoot and repair lubrication systems.
38.04 Troubleshoot and repair induction and exhaust systems.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743270
Course Title: Millwright 7
Course Credit: 1

COURSE DESCRIPTION:

This course develops competencies in metal fabrication and precision layout for operations in the millwright industry. There is no occupational completion point associated with the completion of this course.

39.0 PERFORM METAL FABRICATION--The student will be able to:

39.01 Field sketch equipment supports for applications in the millwright industry.
39.02 Read and interpret requirements in OSHA 1910.211-219 and ANSI B15.1.
39.03 Create, design, draw, fabricate, and paint an OSHA-approved guard.
39.04 Use a Cut-A-Matic to make precision cuts.

40.0 PERFORM PRECISION LAYOUT--The student will be able to:

40.01 Locate an existing benchmark and transfer it to various positions around a work area or site.
40.02 Use the triangle procedure to check established benchmarks with an optical level and a transit.
40.03 Identify and establish center lines of equipment related to building columns.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743280
Course Title: Millwright 8
Course Credit: 1

COURSE DESCRIPTION:

This course develops competencies in advanced rigging operations in the millwright industry. There is no occupational completion point associated with the completion of this course.

41.0 PERFORM ADVANCED RIGGING--The student will be able to:

41.01 Perform and interpret all rigging hand signals.
41.02 Interpret and apply load charts for slings, chokers, and cables.
41.03 Determine the weight of a load.
41.04 Determine the method of lifting.
41.05 Identify crane capacity, including the boom angle and load-swing radius.
41.06 Identify and take the necessary precautions to accommodate weather conditions, load capacity, equipment, and safety factors.
41.07 Balance different types of loads.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743290
Course Title: Millwright 9
Course Credit: 1

COURSE DESCRIPTION:

This course develops competencies in installing, removing, and aligning machinery for operations in the millwright industry. Completion of this course prepares the student for ***OCCUPATIONAL COMPLETION POINT - DATA CODE C, MILLWRIGHT--OES 85123634***

42.0 INSTALL, REMOVE, AND ALIGN MACHINERY--The student will be able to:

42.01 Identify the equipment required for machine installation and removal in millwright applications.
42.02 Operate levers, inclined planes, screws, wedges, wheel and axle assemblies, pulleys, and jacking screws.
42.03 Perform site-clearance operations and demolition and salvage procedures.
42.04 Explain the principles of machine alignment.
42.05 Explain the principles of shaft alignment.
42.06 Explain the relationship of structural problems to misalignment.
42.07 Explain the use of thermal growth by calculation and field-growth techniques such as Essinger bars.
42.08 Align machinery using wire line, transit, dial indicators, a computer, and laser-alignment devices.
42.09 Perform laser horizontal and vertical alignment.
42.10 Perform the train alignment of three or more machines and graph the results.
42.11 Prepare an area for machine installation according to the manufacturer's specifications for selected applications.
42.12 Position and secure machinery on a foundation.
42.13 Level machinery and install balance-vibration dampeners.
42.14 Identify pipe-stress standards for millwright applications.
42.15 Perform finish alignment and check for pipe stresses in millwright applications.

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Florida Department of Education
INTENDED OUTCOMES

Program Title: **Industrial Machinery Maintenance And Repair**

	Secondary	PSAV
Program Number:	**8743100**	**I470303**
CIP Number:	0647.030300	0647.030300
Grade Level:	9-12, 30, 31	30, 31
Length:	9 Credits	1,350 Hours
Certification:	TEC CONSTR @7 G	TEC CONSTR @7 G
	MILLWRIGHT @7 G	MILLWRIGHT @7 G
	BLDG CONST @7 G	BLDG CONST @7 G
	IND ENGR @7 G	IND ENGR @7 G

Basic-Skills Grade Level:	
Math	9
Language	9
Reading	9

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Industrial Machinery Maintenance Assistance - Industry Title

01.0 Apply safety rules and procedures.
02.0 Explain the basic elements of physics as related to Industrial Machinery Maintenance and Repair.
03.0 Explain basic electricity and electronics.
04.0 Perform mathematical calculations.
05.0 Read plans and drawings.
06.0 Perform measuring and layout operations.
07.0 Perform computer applications.
08.0 Use and maintain hand tools.
09.0 Use and maintain portable power tools.
10.0 Handle and apply lubricants.
11.0 Perform benchwork skills.
12.0 Perform gas-welding and cutting operations.
13.0 Perform rigging functions.
14.0 Install and remove machinery.
15.0 Demonstrate conveyor-maintenance techniques.
16.0 Identify common troubles and basic troubleshooting techniques.
17.0 Demonstrate appropriate communication skills.
18.0 Demonstrate employability skills.
19.0 Describe the role of job ownership and entrepreneurship.
20.0 Apply customer-service skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Machinery Maintenance Mechanic - OES 85119632

21.0 Plan an elementary predictive-preventive-maintenance (PPM) schedule.

22.0 Perform gas- and arc-welding procedures.
23.0 Perform machine-shop operations.
24.0 Maintain piping and tubing systems.
25.0 Troubleshoot electrical circuits.
26.0 Install and maintain drive components.
27.0 Maintain reciprocating, positive-displacement, and rotary air compressors.
28.0 Maintain and repair hydraulic-system components.
29.0 Troubleshoot hydraulic systems.
30.0 Maintain and troubleshoot pneumatic systems.
31.0 Maintain and troubleshoot fluid-drive systems.
32.0 Perform pump maintenance and repair.
33.0 Explain the operation of industrial-pollution control systems.
34.0 Troubleshoot air-conditioning and refrigeration systems .
35.0 Identify boilers .
36.0 Repair and maintain basic two-stroke-cycle engines .
37.0 Repair and maintain basic four-stroke-cycle engines .
38.0 Repair and maintain diesel engines .

OCCUPATIONAL COMPLETION POINT - DATA CODE C

Industrial Machinery Maintenance and Repair Specialist

39.0 Prepare for machinery startup.
40.0 Apply vibration-analysis skills.
41.0 Perform machinery balancing.
42.0 Demonstrate predictive-preventive-maintenance (PPM) technologies.
43.0 Use computer-maintenance-management systems (CMMS).
44.0 Perform failure analysis (FA).
45.0 Improve rotating-equipment performance.
46.0 Generate machine improvements and maintenance management.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Industrial Machinery Maintenance And Repair
Secondary Number: 8743100
Postsecondary Number: I470303

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Industrial Machinery Maintenance Assistance - Industry Title

01.0 APPLY SAFETY RULES AND PROCEDURES--The student will be able to:

01.01 Practice shop safety rules and procedures.
01.02 Practice personal safety rules and procedures.
01.03 Practice fire safety rules and procedures.
01.04 Practice electrical safety rules and procedures.
01.05 Practice tool safety rules and procedures.
01.06 Practice ladder and scaffolding safety rules and procedures.
01.07 Maintain a clean work and shop area.
01.08 Perform tag lockout procedures.
01.09 Identify Occupational Safety and Health Administration (OSHA) requirements and procedures.
01.10 Use Materials Safety Data Sheets (MSDS).

02.0 EXPLAIN THE BASIC ELEMENTS OF PHYSICS AS RELATED TO INDUSTRIAL MACHINERY MAINTENANCE AND REPAIR--The student will be able to:

02.01 Explain the standards of measurement and the impact of action and working forces, including tension, compression, torque, and shear.
02.02 Identify the principles and laws of motion and explain how they affect acceleration and deceleration.
02.03 Explain the relationship of work, power, and energy to the types of collisions and conservation of momentum.
02.04 Explain the operation of simple machines, including the lever, inclined plane, screw, wedge, wheel and axle, pulley, and jacking screws.
02.05 Identify the ways of producing power for mechanical efficiency, in terms of gear ratios, work forces, and the types of work done by a crane hook, forklift truck, and screw or bolt.
02.06 Use linear, liquid, and weight units of measurement to measure areas, areas within areas, and volume.
02.07 Describe the mechanical and chemical properties of materials commonly used in industry.
02.08 Explain the laws and conditions governing static and kinetic friction, the problems caused by friction, and the effects of the angle of repose.
02.09 Explain molecular action as a result of temperature extremes, chemical reaction, and moisture content.
02.10 Draw conclusions or make inferences from data.
02.11 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

02.12 Explain pressure measurement in terms of pounds per square inch (PSI), inches of mercury, and Kilopascal (KPa).

03.0 EXPLAIN BASIC ELECTRICITY AND ELECTRONICS--The student will be able to:

03.01 Define electrical/electronics terms.
03.02 Explain the theory and application of magnetism.
03.03 Explain Ohm's law.
03.04 Describe direct current (DC) and alternating current (AC) circuits.
03.05 Identify the advantages and disadvantages of alternating current (AC) and direct current (DC) motors for various applications.
03.06 Describe the use of programmable logic controllers (PLCs) in the industry.

04.0 PERFORM MATHEMATICAL CALCULATIONS--The student will be able to:

04.01 Make job-related decimal and fraction calculations.
04.02 Solve job-related problems by adding, subtracting, multiplying, and dividing numbers.
04.03 Solve job-related problems using a hand-held calculator.
04.04 Solve job-related problems using basic formulas.
04.05 Solve job-related problems using basic geometry.
04.06 Measure a workpiece and compare the measurements with blueprint specifications.
04.07 Solve job-related problems using mathematical handbooks, charts, and tables.
04.08 Convert measurements from English to metric and from metric to English units.
04.09 Solve job-related problems using proportions.
04.10 Solve job-related problems using statistics.

05.0 READ PLANS AND DRAWINGS--The student will be able to:

05.01 Identify dimensions.
05.02 Identify lists of materials and specifications.
05.03 Identify section and detail views.
05.04 Sketch and dimension a part.
05.05 Disassemble and assemble parts using an exploded-view drawing.
05.06 Interpret blueprint abbreviations.
05.07 Identify dimensioning of radii, round holes, fillets, and chamfers.
05.08 Identify screw threads and bolt types.
05.09 Apply dimensional tolerances.
05.10 Identify the metal-fabrication symbols used in blueprints.

06.0 PERFORM MEASURING AND LAYOUT OPERATIONS--The student will be able to:

06.01 Perform basic geometric-construction operations.
06.02 Safely use marking gauges, center punches, scribes, surface gauges, squares, dividers, dial indicators, protractors, surface plates, depth gauges, and circumference rules.

06.03 Develop patterns using parallel lines, radial lines, and triangulation.
06.04 Make metal-fabrication sketches.
06.05 Read and measure with steel rules.
06.06 Read and measure with micrometers.
06.07 Read and measure with vernier tools.
06.08 Read and measure with dial calipers.
06.09 Read and measure with dial indicators.

07.0 PERFORM COMPUTER APPLICATIONS--The student will be able to:

07.01 Explain the use of computers in plant operations.
07.02 Describe information processing.
07.03 Identify types of computers.
07.04 Identify keyboard functions.
07.05 Identify data input and output devices.
07.06 Describe computer programs.
07.07 Perform power-up and power-down procedures.
07.08 Back up data and save and print documents from a personal computer (PC).
07.09 Identify the effects of and the methods for checking for a virus in a PC system.

08.0 USE AND MAINTAIN HAND TOOLS--The student will be able to:

08.01 Demonstrate the safe use of hand tools such as screwdrivers, hammers, wrenches, pliers, hacksaws, punches, chisels, drills, files, tin snips, taps, and dies
08.02 Use measuring devices.
08.03 Use wrenches and screwdrivers.
08.04 Use pipefitting tools.
08.05 Use sheet-metal tools.
08.06 Safely use ropes, slings, pulleys, and block and tackle.
08.07 Select the proper tool for each job application.
08.08 Select correct tools for metric and standard fasteners.
08.09 Identify state-of-the-art innovations and explore their uses.
08.10 Identify and select fasteners for various applications, taking into account the effects of corrosion on each, including threaded fasteners, nuts, washers, rivets, locking pins, keys, self-tapping screws, locking-nut fasteners, and self-retaining nuts.
08.11 Describe the techniques and liability issues regarding retrofitting fasteners for ease of removal.

09.0 USE AND MAINTAIN PORTABLE POWER TOOLS--The student will be able to:

09.01 Demonstrate the safe use of portable power tools, drills, belt and disc sanders, grinders, circular saws, saber saws, metal shears, electric and pneumatic impact wrenches, rotary and pneumatic chipping hammers, drill presses, and bench grinders.
09.02 Use and maintain light- and heavy-duty drills.
09.03 Use and maintain electric hammers
09.04 Use and maintain pneumatic drills and hammers.
09.05 Use and maintain power screwdrivers and nut runners.

09.06 Use and maintain linear motion saws.
09.07 Use and maintain circular saws.
09.08 Use and maintain belt, pad, and disc sanders.
09.09 Use and maintain grinders and shears.

10.0 HANDLE AND APPLY LUBRICANTS--The student will be able to:

10.01 Explain the functions of lubrication.
10.02 Explain the properties of oil lubricants and the factors determining the selection of lubricants.
10.03 Identify the types, advantages, and functions of lubricant additives.
10.04 Explain the types of circulating oils and their purposes.
10.05 Identify grease application.
10.06 Identify lubricating systems and methods.
10.07 Explain lubricant storage and handling methods.
10.08 Explain the types of oil filters and their uses.
10.09 Lubricate a piece of industrial equipment.
10.10 Define the role of preventive maintenance in total equipment maintenance.
10.11 Describe the major tasks of preventive maintenance: cleaning, inspection, lubrication, minor repair, and information feedback.
10.12 Review a typical maintenance program.

11.0 PERFORM BENCHWORK SKILLS--The student will be able to:

11.01 Identify safety and shop rules.
11.02 Cut materials by using hand hacksaws.
11.03 Cut threads by using hand taps.
11.04 Cut threads by using dies.
11.05 Repair threads by chasing and thread inserts.
11.06 Install dowel pins using tapered and straight reamers.
11.07 Ream holes by using tapered and straight reamers.
11.08 Hand-sharpen cutting tools by using abrasive stones.
11.09 Hone and lap surfaces.
11.10 Remove damaged screws and other hardware.
11.11 Deburr workpieces.

12.0 PERFORM GAS-WELDING AND CUTTING OPERATIONS--The student will be able to:

12.01 Identify the properties of the most commonly used metals and alloys, including hardness and malleability.
12.02 Identify the processes and effects of tempering, annealing, and case hardening.
12.03 Identify welding cylinders, regulators, hoses, pressure gauges, and torches.
12.04 Describe welding-equipment safety procedures.
12.05 Demonstrate proper flame settings.
12.06 Demonstrate basic gas-welding skills.
12.07 Demonstrate procedures for adjusting and operating the oxyacetylene cutting torch.
12.08 Demonstrate freehand and guide cutting of various metal thicknesses.

12.09 Identify the uses of the following welding techniques: laser, ultrasonic, resistance, and percussion.

13.0 PERFORM RIGGING FUNCTIONS--The student will be able to:

13.01 Demonstrate the safety procedures for performing rigging and lifting operations.
13.02 Identify and inspect fiber and wire rope.
13.03 Tie knots and hitches.
13.04 Identify and use the components of rigging hardware.
13.05 Perform rigging and lifting operations.
13.06 Demonstrate the proper operation of a forklift.

14.0 INSTALL AND REMOVE MACHINERY--The student will be able to:

14.01 Identify the safety procedures for installing and removing machinery.
14.02 Identify the equipment required for machine installation and removal.
14.03 Prepare an area for machine installation per the manufacturer's specifications.
14.04 Rig, lift, and transport machinery to the installation site.
14.05 Install electrical hookups to machinery.
14.06 Install air hydraulic hookups to machinery.
14.07 Perform an assigned machine retrofit per the manufacturer's specifications.
14.08 Perform an assigned machine removal and transport per specification requirements.
14.09 Explain the importance of vibration detection.

15.0 DEMONSTRATE CONVEYOR-MAINTENANCE TECHNIQUES--The student will be able to:

15.01 Identify the types of conveyors.
15.02 Identify the safety requirements and precautions for conveyor-maintenance operations.
15.03 Adjust the tracking of a belt.
15.04 Check a belt for wear.
15.05 Identify the types of splices.
15.06 Identify splicing equipment and procedures.
15.07 Demonstrate conveyor-maintenance techniques, including making splices with splicing equipment.

16.0 IDENTIFY COMMON TROUBLES AND BASIC TROUBLESHOOTING TECHNIQUES--The student will be able to:

16.01 Analyze the possible causes of common troubles in industrial machinery performance.
16.02 Identify basic troubleshooting techniques for bearings.
16.03 Identify basic troubleshooting techniques for pumps.
16.04 Identify basic troubleshooting techniques for drive systems.
16.05 Identify basic troubleshooting techniques for electrical circuits.
16.06 Identify basic troubleshooting techniques for hydraulics.

16.07 Identify basic troubleshooting techniques for pneumatics.
16.08 Identify basic troubleshooting techniques for PLCs.

17.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

17.01 Write logical and understandable statements, or phrases, to accurately fill out forms and documents commonly used in business and industry.
17.02 Read and interpret graphs, charts, diagrams, and tables commonly used in business and industry.
17.03 Read and follow written and oral instructions.
17.04 Answer and ask questions coherently and concisely.
17.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
17.06 Demonstrate appropriate communication skills, including telecommunications.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct a job search.
18.02 Secure information about a job.
18.03 Identify the documents that may be required for a job application.
18.04 Complete a resume.
18.05 Complete a job-application form correctly.
18.06 Demonstrate competence in job-interview techniques.
18.07 Identify or demonstrate appropriate responses to criticism from an employer, a supervisor, or other persons.
18.08 Identify acceptable work habits.
18.09 Describe how to make appropriate job changes.
18.10 Demonstrate acceptable employee health habits.
18.11 Describe the purpose of the Florida "Right-to-Know" law as recorded in the Florida Statutes, Chapter 442.

19.0 DESCRIBE THE ROLE OF JOB OWNERSHIP AND ENTREPRENEURSHIP--The student will be able to:

19.01 Define "entrepreneurship."
19.02 Describe the importance of entrepreneurship to the American economy.
19.03 List the advantages and disadvantages of business ownership and demonstrate ownership as an employee.
19.04 Identify the risks involved in the ownership of a business.
19.05 Identify the necessary personal characteristics and business skills of a successful entrepreneur.
19.06 Identify the need for teamwork, team roles when working in a factory or doing shift work, and team development.
19.07 Describe how attitudes toward work responsibilities, absences, and tardiness affect job success.

20.0 APPLY CUSTOMER-SERVICE SKILLS--The student will be able to:

20.01 Explain the need for customer satisfaction.

20.02 Prepare service orders properly.
20.03 Communicate solutions to customers.
20.04 Demonstrate methods of handling an irate customer.
20.05 Follow manufacturers' service manuals.
20.06 Locate parts in a printed or computerized catalog or on microfiche.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Machinery Maintenance Mechanic - OES 85119632

21.0 PLAN AN ELEMENTARY PREDICTIVE-PREVENTIVE-MAINTENANCE (PPM) SCHEDULE--The student will be able to:

21.01 List the types of predictive-preventive maintenance.
21.02 Describe the purpose of preventive-maintenance schedules.
21.03 Create a preventive-maintenance schedule form using a machine manual or the manufacturer's recommendations.
21.04 Identify troubles caused by the lack of preventive maintenance.
21.05 Create a maintenance log and make entries for a machine or equipment.
21.06 Create a preventive-maintenance schedule from a maintenance-failures log.

22.0 PERFORM GAS- AND ARC-WELDING PROCEDURES--The student will be able to:

22.01 Demonstrate the safety procedures for performing gas and arc welding and for transporting equipment.
22.02 Identify the components of an oxyfuel rig.
22.03 Set up and shut down an oxyfuel rig.
22.04 Weld beads in a flat position.
22.05 Weld an outside corner joint using a filler rod.
22.06 Cut metal of various thicknesses.
22.07 Weld beads in a flat position using E-6010 and E-7018 electrodes.
22.08 Weld beads in horizontal and in vertical positions using E-6010 and E-7018 electrodes.
22.09 Weld beads in an overhead position using E-6010 and E-7018 electrodes.
22.10 Weld beads using a mig welder.
22.11 Weld beads using a tig welder.
22.12 Solder and braze metals.
22.13 Cut stainless steel and aluminum with a plasma-arc rig.

23.0 PERFORM MACHINE-SHOP OPERATIONS--The student will be able to:

23.01 Demonstrate safety in performing machine-shop operations.
23.02 Identify the types of cutting tools.
23.03 Bore a hole to a specified size.
23.04 Chase an external V-thread.
23.05 Identify the different types of work-holding devices.
23.06 Prepare metal for finishing.
23.07 Set up, use, and adjust an arbor press.
23.08 Set up, use, and adjust a hydraulic press.
23.09 Set up, use, and adjust broaching tools.

23.10 Cut keyways with an end mill.

24.0 MAINTAIN PIPING AND TUBING SYSTEMS--The student will be able to:

24.01 Identify the components of a piping system.
24.02 Explain the maintenance considerations of metallic and nonmetallic piping systems.
24.03 Describe the safety requirements for working with piping and tubing systems.
24.04 Join copper tubing.
24.05 Join common fittings.
24.06 Join metallic pipe.
24.07 Join plastic pipe.
24.08 Explain valve operation and maintenance.
24.09 Explain the importance of strainers, filters, and traps in piping systems.
24.10 Bend back-to-back, stub-ups, and doglegs in electrical metallic tubing (EMT).

25.0 TROUBLESHOOT ELECTRICAL CIRCUITS--The student will be able to:

25.01 Describe the safety requirements and precautions for troubleshooting electrical circuits.
25.02 Disconnect and reconnect electric motors.
25.03 Identify the parts and function of electrical control equipment.
25.04 Define digital devices and PLC logic/ladder logic to troubleshoot.
25.05 Identify the function of input and output devices and the controller.
25.06 Explain how to troubleshoot a sequence of events.
25.07 Use and maintain electrical test equipment for troubleshooting.

26.0 INSTALL AND MAINTAIN DRIVE COMPONENTS--The student will be able to:

26.01 Demonstrate safety procedures for installing and maintaining drive components.
26.02 Identify the types of bearings, their cross-referencing, and their uses.
26.03 Remove, inspect, and/or replace bearings.
26.04 Remove and replace seals.
26.05 Perform shaft alignment.
26.06 Identify the types of belts.
26.07 Identify the types of chains.
26.08 Perform tension adjustments and alignment on belt and chain drives.
26.09 Troubleshoot belt and chain drives.
26.10 Identify the types of gears.
26.11 Remove, replace, and align gears, sprockets, and couplings.
26.12 Remove, replace, or repair V-joints and jack shafts.
26.13 Adjust gear backlash.
26.14 Troubleshoot gear drives.
26.15 Disassemble, inspect, reassemble, and adjust clutches.
26.16 Identify the types of variable-speed drives.

26.17 Troubleshoot variable-speed drives.
26.18 Identify the types of cams and link mechanisms.
26.19 Troubleshoot cam-and-link mechanism problems.

27.0 MAINTAIN RECIPROCATING, POSITIVE-DISPLACEMENT, AND ROTARY AIR COMPRESSORS--The student will be able to:

27.01 Relate force, weight, mass, and density to a pneumatic system.
27.02 Demonstrate the safety procedures for maintaining reciprocating, positive-displacement, and rotary air compressors.
27.03 Demonstrate the operation of reciprocating compressors.
27.04 Demonstrate the operation of positive-displacement and rotary air compressors.
27.05 Demonstrate primary and secondary air treatment.
27.06 Demonstrate the operation of valves, cylinders, and motors.
27.07 Check oil level.
27.08 Change oil.
27.09 Drain water from tank.
27.10 Test for efficiency of compressor.
27.11 Inspect storage tank for quality.
27.12 Test pressure control switch.

28.0 MAINTAIN AND REPAIR HYDRAULIC-SYSTEM COMPONENTS--The student will be able to:

28.01 Explain the safety procedures for installing hydraulic lines.
28.02 Explain Pascal's law.
28.03 Explain Bernoulli's principle.
28.04 Explain how heat and pressure relate to power and transmission.
28.05 Describe the physical and chemical properties of a fluid.
28.06 Install and maintain a contaminant-removal system.
28.07 Determine reservoir requirements.
28.08 Classify and select pumps for specific applications.
28.09 Compute hose requirements.
28.10 Install hydraulic lines.
28.11 Select and install control valves.

29.0 TROUBLESHOOT HYDRAULIC SYSTEMS--The student will be able to:

29.01 Explain the safety procedures for troubleshooting hydraulic systems.
29.02 Read a hydraulic schematic.
29.03 Install hydraulic components.
29.04 Connect electrically controlled valves.
29.05 Explain hydraulic-system troubleshooting techniques.
29.06 Repair and replace valves.
29.07 Repair and replace cylinders.
29.08 Repair and replace pumps and motors.

30.0 MAINTAIN AND TROUBLESHOOT PNEUMATIC SYSTEMS--The student will be able to:

30.01 Explain the safety procedures for troubleshooting pneumatic systems.
30.02 Diagram an air supply system.
30.03 Install system components.
30.04 Demonstrate system-maintenance techniques.
30.05 Explain proper troubleshooting procedures.
30.06 Troubleshoot air compressors.
30.07 Troubleshoot, repair, and install control valves.
30.08 Troubleshoot air motors.

31.0 MAINTAIN AND TROUBLESHOOT FLUID-DRIVE SYSTEMS--The student will be able to:

31.01 Explain the safety procedures for maintaining and troubleshooting fluid-drive systems.
31.02 Install adjustable-speed drives.
31.03 Troubleshoot adjustable-speed drives.
31.04 Explain the operation of fluid couplings.
31.05 Install fluid couplings.
31.06 Install torque converters.
31.07 Perform preventive maintenance.
31.08 Apply a "dynamic" magnetic/mechanical braking device to a motor.
31.09 Mount the equipment.

32.0 PERFORM PUMP MAINTENANCE AND REPAIR--The student will be able to:

32.01 Demonstrate the safety procedures for performing pump maintenance.
32.02 Determine pump capacity and system requirements.
32.03 Perform pump maintenance.
32.04 Identify packing and seal requirements.
32.05 Explain the operating principles of centrifugal, propeller and turbine rotary, reciprocating, diaphragm, positive placement, and vacuum pumps.
32.06 Disassemble and reassemble a pump.

33.0 EXPLAIN THE OPERATION OF INDUSTRIAL-POLLUTION CONTROL SYSTEMS--The student will be able to:

33.01 Explain the operation of air-pollution control systems.
33.02 Explain the operation of water-pollution control systems.
33.03 Explain the operation of solid-waste pollution control systems.
33.04 Explain the operation of noise-pollution control systems.

34.0 TROUBLESHOOT AIR-CONDITIONING AND REFRIGERATION SYSTEMS--The student will be able to:

34.01 Explain the principles of refrigeration.
34.02 Identify the major components.
34.03 Describe the functions of electrical systems.
34.04 Troubleshoot air-conditioning and refrigeration systems.
34.05 Explain the requirement for recovery of hazardous materials and related safety procedures.

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35.0 IDENTIFY BOILERS--The student will be able to:

35.01 Identify the various types and components of heat exchangers.
35.02 Identify the various types and components of boilers.
35.03 Identify the various types and components of fractioning columns.
35.04 Identify the uses of steam.

36.0 REPAIR AND MAINTAIN BASIC TWO-STROKE-CYCLE ENGINES--The student will be able to:

36.01 Explain the basic principles of operation of the two-stroke-cycle combustion engine.
36.02 Identify the types of engines.
36.03 Locate engine serial and model numbers.
36.04 Identify engine assemblies and systems.
36.05 Disassemble engines.
36.06 Remove, clean, and inspect the head for cracks, warpage, and damaged spark-plug threads.
36.07 Diagnose head problems by use of the visual-inspection method.
36.08 Diagnose head problems by use of the compression-tester method.
36.09 Diagnose head problems by use of the cylinder air-pressure method.
36.10 Diagnose head problems by use of the stethoscope method.
36.11 Remove, clean, and inspect piston rods and assemblies.
36.12 Measure out-of-round piston and cylinder.
36.13 Hone cylinders as required by the manufacturer's specifications.
36.14 Check the total bearing surface of connecting rod bearings.
36.15 Measure piston skirts and ring grooves.
36.16 Measure the piston-ring gap in the cylinder bore.
36.17 Install piston pins according to the manufacturer's specifications.
36.18 Check the rod-and-piston assembly alignment.
36.19 Install rings on pistons.
36.20 Install rod-and-piston assemblies.
36.21 Check needle bearings.
36.22 Measure and check crankshafts with a micrometer to diagnose engine problems.
36.23 Inspect crankshafts and install seals.
36.24 Inspect, clean, and/or replace reed valves.
36.25 Reassemble engines.

37.0 REPAIR AND MAINTAIN BASIC FOUR-STROKE-CYCLE ENGINES--The student will be able to:

37.01 Explain the basic principles of operation of the four-stroke-cycle internal-combustion engine.
37.02 Identify the types of four-stroke-cycle engines.
37.03 Locate engine serial and model numbers.
37.04 Identify engine assemblies and systems.

37.05 Diagnose valve and head problems by use of the visual-inspection method, i.e., water contamination v. fuel-rich or lean carburetor adjustment.
37.06 Diagnose valve and head problems by use of the compression-tester method.
37.07 Diagnose valve and head problems by use of the cylinder air-pressure method.
37.08 Diagnose valve and head problems by use of the stethoscope method.
37.09 Disassemble engines.
37.10 Clean and inspect heads for cracks, warpage, and damaged spark-plug threads.
37.11 Inspect valves for warpage, burns, cracks, stem wear, time wear, and margin.
37.12 Grind valve seats and reface valves.
37.13 Check and inspect springs for free height, distortion, and installed height.
37.14 Adjust a valve lash.
37.15 Remove and inspect camshafts and lifters.
37.16 Measure camshafts.
37.17 Service camshaft bearings.
37.18 Clean and inspect lifters for wear.
37.19 Time valve-drive assemblies.
37.20 Remove the piston from rod assemblies.
37.21 Measure piston out-of-round and cylinder taper with a dial bore gauge or micrometer.
37.22 Check piston pins and bosses for wear.
37.23 Measure piston ring lands width, out-of-round, and taper.
37.24 Measure the piston-ring gap in the cylinder bore.
37.25 Install and fit piston pins.
37.26 Check the rod-and-piston assembly alignment.
37.27 Remove and replace rod bearings.
37.28 Hone and clean cylinders.
37.29 Install rings on pistons.
37.30 Measure and check crankshafts with a micrometer.
37.31 Check for end play.
37.32 Check the bearing bore with a telescoping gauge using special tools provided by the engine manufacturer.
37.33 Reassemble engines.
37.34 Install oil seals.

38.0 REPAIR AND MAINTAIN DIESEL ENGINES--The student will be able to:

38.01 Identify diesel-engine construction, the types of engines, and the principles of operation (two- and four-stroke).
38.02 Troubleshoot and repair cooling systems.
38.03 Troubleshoot and repair lubrication systems.
38.04 Troubleshoot and repair induction and exhaust systems.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
Industrial Maintenance Specialist--Industry Title

39.0 PREPARE FOR MACHINERY STARTUP--The student will be able to:

39.01 Describe the requirements and precautions for machinery startup.
39.02 Align machinery using wire line, transit, dial indicators, a computer, and laser-alignment devices.
39.03 Position and secure machinery on a foundation.
39.04 Level machinery and install balance-vibration dampeners.
39.05 Identify pipe-stress standards for machine-maintenance applications.
39.06 Perform finish alignment and check for pipe stresses in machinery- maintenance applications.

40.0 APPLY VIBRATION-ANALYSIS SKILLS--The student will be able to:

40.01 Collect vibration data.
40.02 Interpret vibration data.
40.03 Determine velocity, acceleration, spike energy, frequency, amplitude, and other vibration sources.
40.04 Describe the safety requirements and precautions for vibration analysis.
40.05 Operate and use vibration software.
40.06 Predict and verify the condition of machinery in an industrial setting using vibration tools.
40.07 Explain the approximately 25 sources of vibration.
40.08 Explain the bearing frequency (BIFO) formulas.
40.09 Demonstrate proficiency in vibration detection.

41.0 PERFORM MACHINERY BALANCING--The student will be able to:

41.01 Describe the safety requirements and precautions for balancing procedures and equipment.
41.02 Identify the principles of static balancing.
41.03 Perform a vector balance in the classroom.
41.04 Identify balancing standards, ISO 1940 or equal.
41.05 Perform a stand balance in a shop.
41.06 Perform a field balance in an industrial setting.
41.07 Use portable or stationary balancing equipment.

42.0 DEMONSTRATE PREDICTIVE-PREVENTIVE-MAINTENANCE (PPM) TECHNOLOGIES--The student will be able to:

42.01 Explain the use of infrared thermography.
42.02 Explain the use of ultrasound technology.
42.03 Explain the use of advanced alignment techniques (optical and Essinger bars).
42.04 Explain the use of oil ferrography and the types of oil sampling.
42.05 Explain the use of shock pulse equipment.
42.06 Describe the safety requirements for PPM technologies.
42.07 Demonstrate the use of one of the above predictive-maintenance procedures.
42.08 Plan an advanced PPM schedule.

43.0 USE COMPUTER-MAINTENANCE-MANAGEMENT SYSTEMS (CMMS)--The student will be able to:

43.01 Operate CMMS software.
43.02 Enter and close a maintenance work order with CMMS.
43.03 Schedule a series of maintenance tasks.
43.04 Write a detailed maintenance job plan.
43.05 Order parts and supplies for a maintenance work order.
43.06 Determine the personnel resources needed for a maintenance job.

44.0 PERFORM FAILURE ANALYSIS--The student will be able to:

44.01 Conduct/lead a failure analysis meeting to determine the root cause of a failure.
44.02 Create a failure-analysis form and write a minimum of two different types of failure-analysis reports.
44.03 Explain the types of bearing failures.
44.04 Explain the types of shaft fatigues and failures.
44.05 Explain the types of lubrication breakdowns.
44.06 Estimate the cost and the impact on production of a specific failure.

45.0 IMPROVE ROTATING-EQUIPMENT PERFORMANCE--The student will be able to:

45.01 Calculate shaft-deflection ratios and use the results to improve shaft design.
45.02 Draw or sketch equipment bases and supports of sturdy construction.
45.03 Demonstrate and install advanced labyrinth-sealing devices.
45.04 Demonstrate and install advanced mechanical-sealing devices.
45.05 Run the Gates Belts or another interactive belt-design-and-tensioning computer program applied to various drives.
45.06 Explain the benefits of synthetic oils and greases.
45.07 Explain MTBF (mean time between equipment failure) and its cost impact when machinery life is extended.
45.08 List seven specific machinery-improvement ideas in detail.

46.0 GENERATE MACHINE IMPROVEMENTS AND MAINTENANCE MANAGEMENT--The student will be able to:

46.01 Review and critique machinery and base design for improvement, before the equipment is placed on order.
46.02 Identify the essential elements of effective maintenance management:
a. reward system
b. predictive-preventive maintenance
c. planning
d. work-order systems
e. organizations
f. goals and tracking
g. facilities
h. storerooms
i. contractors
j. shutdowns
46.03 Write a report on the design and effective use of at least two of the essential elements of management.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743210
Course Title: Maintenance Skills 1
Course Credit: 1

COURSE DESCRIPTION:

This course develops the competencies of applying safety rules and procedures, relating the basic elements of physics and of electricity and electronics to Industrial Machinery Maintenance and Repair, performing mathematical calculations, reading plans and drawings, performing measuring and layout operations, and performing computer applications in the industrial-machinery maintenance-technology industry. There is no occupational completion point associated with the completion of this course.

01.0 APPLY SAFETY RULES AND PROCEDURES--The student will be able to:

01.01 Practice shop safety rules and procedures.
01.02 Practice personal safety rules and procedures.
01.03 Practice fire safety rules and procedures.
01.04 Practice electrical safety rules and procedures.
01.05 Practice tool safety rules and procedures.
01.06 Practice ladder and scaffolding safety rules and procedures.
01.07 Maintain a clean work and shop area.
01.08 Perform tag lockout procedures.
01.09 Identify Occupational Safety and Health Administration (OSHA) requirements and procedures.
01.10 Use Materials Safety Data Sheets (MSDS).

02.0 EXPLAIN THE BASIC ELEMENTS OF PHYSICS AS RELATED TO INDUSTRIAL MACHINERY MAINTENANCE AND REPAIR--The student will be able to:

02.01 Explain the standards of measurement and the impact of action and working forces, including tension, compression, torque, and shear.
02.02 Identify the principles and laws of motion and explain how they affect acceleration and deceleration.
02.03 Explain the relationship of work, power, and energy to the types of collisions and the conservation of momentum.
02.04 Explain the operation of simple machines, including the lever, inclined plane, screw, wedge, wheel and axle, pulley, and jacking screws.
02.05 Identify the ways of producing power for mechanical efficiency, in terms of gear ratios, work forces, and types of work done by a crane hook, forklift truck, and screw or bolt.
02.06 Use linear, liquid, and weight units of measurement to measure areas, areas within areas, and volume.
02.07 Describe the mechanical and chemical properties of materials commonly used in industry.

02.08 Explain the laws and conditions governing static and kinetic friction, the problems caused by friction, and the effects of the angle of repose.

02.09 Explain molecular action as a result of temperature extremes, chemical reaction, and moisture content.

02.10 Draw conclusions or make inferences from data.

02.11 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

02.12 Explain pressure measurement in terms of pounds per square inch (PSI), inches of mercury, and Kilopascal (KPa).

03.0 EXPLAIN BASIC ELECTRICITY AND ELECTRONICS--The student will be able to:

03.01 Define electrical/electronics terms.

03.02 Explain the theory and application of magnetism.

03.03 Explain Ohm's law.

03.04 Describe direct current (DC) and alternating current (AC) circuits.

03.05 Identify the advantages and disadvantages of alternating current (AC) and direct current (DC) motors for various applications.

03.06 Describe the use of programmable logic controllers (PLCs) in industry.

04.0 PERFORM MATHEMATICAL CALCULATIONS--The student will be able to:

04.01 Make job-related decimal and fraction calculations.

04.02 Solve job-related problems by adding, subtracting, multiplying, and dividing numbers.

04.03 Solve job-related problems using a hand-held calculator.

04.04 Solve job-related problems using basic formulas.

04.05 Solve job-related problems using basic geometry.

04.06 Measure a workpiece and compare the measurements with blueprint specifications.

04.07 Solve job-related problems using mathematical handbooks, charts, and tables.

04.08 Convert measurements from English to metric and from metric to English units.

04.09 Solve job-related problems using proportions.

04.10 Solve job-related problems using statistics.

05.0 READ PLANS AND DRAWINGS--The student will be able to:

05.01 Identify dimensions.

05.02 Identify lists of materials and specifications.

05.03 Identify section and detail views.

05.04 Sketch and dimension a part.

05.05 Disassemble and assemble parts using an exploded-view drawing.

05.06 Interpret blueprint abbreviations.

05.07 Identify dimensioning of radii, round holes, fillets, and chamfers.

05.08 Identify screw threads and bolt types.

05.09 Apply dimensional tolerances.

05.10 Identify the metal-fabrication sybols used in blueprints.

06.0 PERFORM MEASURING AND LAYOUT OPERATIONS--he student will be able to:

06.01 Perform basic geometric-constructon operations.
06.02 Safely use marking gauges, centerpunches, scribes, surface gauges, squares, dividers, dial idicators, protractors, surface plates, depth gauges, andcircumference rules.
06.03 Develop patterns using parallel lnes, radial lines, and triangulation.
06.04 Make metal-fabrication sketches.
06.05 Read and measure with steel rules
06.06 Read and measure with micrometers
06.07 Read and measure with vernier tocs.
06.08 Read and measure with dial calipes.
06.09 Read and measure with dial indicaors.

07.0 PERFORM COMPUTER APPLICATIONS--The studen will be able to:

07.01 Explain the use of computers in pant operations.
07.02 Describe information processing.
07.03 Identify types of computers.
07.04 Identify keyboard functions.
07.05 Identify data input and output deices.
07.06 Describe computer programs.
07.07 Perform power-up and power-down pocedures.
07.08 Back up data and save and print ocuments from a personal computer (PC).
07.09 Identify the effects of and the mthods for chcking for a virus in a PC system.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743220
Course Title: Maintenance Skills 2
Course Credit: 1

COURSE DESCRIPTION:

This course develops the competencies of using and maintaining hand and portable power tools, handling and applying lubricants, applying basic benchwork skills, and performing basic gas-welding and cutting operations in the industrial-machinery maintenance-technology industry. There is no occupational completion point associated with the completion of this course.

08.0 USE AND MAINTAIN HAND TOOLS--The student will be able to:

08.01 Demonstrate the safe use of hand tools such as screwdrivers, hammers, wrenches, pliers, hacksaws, punches, chisels, drills, files, tin snips, taps, and dies.
08.02 Use measuring devices.
08.03 Use wrenches and screwdrivers.
08.04 Use pipefitting tools.
08.05 Use sheet-metal tools.
08.06 Safely use ropes, slings, pulleys, and block and tackle.
08.07 Select the proper tool for each job application.
08.08 Select correct tools for metric and standard fasteners.
08.09 Identify state-of-the-art innovations and explore their uses.
08.10 Identify and select fasteners for various applications, taking into account the effects of corrosion on each, including threaded fasteners, nuts, washers, rivets, locking pins, keys, self-tapping screws, locking-nut fasteners, and self-retaining nuts.
08.11 Describe the techniques and liability issues regarding retrofitting fasteners for ease of removal.

09.0 USE AND MAINTAIN PORTABLE POWER TOOLS--The student will be able to:

09.01 Demonstrate the safe use of portable power tools such as drills, belt and disc sanders, grinders, circular saws, saber saws, metal shears, electric and pneumatic impact wrenches, rotary and pneumatic chipping hammers, drill presses, and bench grinders.
09.02 Use and maintain light- and heavy-duty drills.
09.03 Use and maintain electric hammers.
09.04 Use and maintain pneumatic drills and hammers.
09.05 Use and maintain power screwdrivers and nut runners.
09.06 Use and maintain linear-motion saws.
09.07 Use and maintain circular saws.
09.08 Use and maintain belt, pad, and disc sanders.
09.09 Use and maintain grinders and shears.

10.0 HANDLE AND APPLY LUBRICANTS--The student will be able to:

10.01 Explain the functions of lubrication.
10.02 Explain the properties of oil lubricants and the factors determining the selection of lubricants.
10.03 Identify the types, advantages, and functions of lubricant additives.
10.04 Explain the types of circulating oils and their purposes.
10.05 Identify grease application.
10.06 Identify lubricating systems and methods.
10.07 Explain lubricant storage and handling methods.
10.08 Explain the types of oil filters and their uses.
10.09 Lubricate a piece of industrial equipment.
10.10 Define the role of preventive maintenance in total equipment maintenance.
10.11 Describe the major tasks of preventive maintenance: cleaning, inspection, lubrication, minor repair, and information feedback.
10.12 Review a typical maintenance program.

11.0 PERFORM BENCHWORK SKILLS--The student will be able to:

11.01 Identify safety and shop rules.
11.02 Cut materials by using hand hacksaws.
11.03 Cut threads by using hand taps.
11.04 Cut threads by using dies.
11.05 Repair threads by chasing and thread inserts.
11.06 Install dowel pins using tapered and straight reamers.
11.07 Ream holes by using tapered and straight reamers.
11.08 Hand-sharpen cutting tools by using abrasive stones.
11.09 Hone and lap surfaces.
11.10 Remove damaged screws and other hardware.
11.11 Deburr workpieces.

12.0 PERFORM GAS-WELDING AND CUTTING OPERATIONS--The student will be able to:

12.01 Identify the properties of the most commonly used metals and alloys, including hardness and malleability.
12.02 Identify the processes and effects of tempering, annealing, and case hardening.
12.03 Identify welding cylinders, regulators, hoses, pressure gauges, and torches.
12.04 Describe welding-equipment safety procedures.
12.05 Demonstrate proper flame settings.
12.06 Demonstrate basic gas-welding skills.
12.07 Demonstrate procedures for adjusting and operating the oxyacetylene cutting torch.
12.08 Demonstrate freehand and guide cutting of various metal thicknesses.
12.09 Identify the uses of the following welding techniques: laser, ultrasonic, resistance, and percussion.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743230
Course Title: Maintenance Skills 3
Course Credit: 1

COURSE DESCRIPTION:

This course develops competencies in rigging and lifting, installing and removing machinery, conveyor maintenance, troubleshooting machinery performance, communicating, servicing customers, obtaining employment, and entrepreneurship skills in the industrial-machinery maintenance-technology industry. Completion of this course prepares the student for ***OCCUPATIONAL COMPLETION POINT - DATA CODE A, INDUSTRIAL MACHINERY MAINTENANCE*** Assistant--Industry Title.

13.0 PERFORM RIGGING FUNCTIONS--The student will be able to:

13.01 Demonstrate the safety procedures for performing rigging and lifting operations.
13.02 Identify and inspect fiber and wire rope.
13.03 Tie knots and hitches.
13.04 Identify and use the components of rigging hardware.
13.05 Perform rigging and lifting operations.
13.06 Demonstrate the proper operation of a forklift.

14.0 INSTALL AND REMOVE MACHINERY--The student will be able to:

14.01 Identify the safety procedures for installing and removing machinery.
14.02 Identify the equipment required for machine installation and removal.
14.03 Prepare an area for machine installation per the manufacturer's specifications.
14.04 Rig, lift, and transport machinery to the installation site.
14.05 Install electrical hookups to machinery.
14.06 Install air hydraulic hookups to machinery.
14.07 Perform an assigned machine retrofit per manufacturer's specifications.
14.08 Perform an assigned machine removal and transport per specification requirements.
14.09 Explain the importance of vibration detection.

15.0 DEMONSTRATE CONVEYOR-MAINTENANCE TECHNIQUES--The student will be able to:

15.01 Identify the types of conveyors.
15.02 Identify the safety requirements and precautions for conveyor-maintenance operations.
15.03 Adjust the tracking of a belt.
15.04 Check a belt for wear.

15.05 Identify the types of splices.
15.06 Identify splicing equipment and procedures.
15.07 Demonstrate conveyor-maintenance techniques, including making splices with splicing equipment.

16.0 IDENTIFY COMMON TROUBLES AND BASIC TROUBLESHOOTING TECHNIQUES--The student will be able to:

16.01 Analyze the possible causes of common troubles in industrial-machinery performance.
16.02 Identify basic troubleshooting techniques for bearings.
16.03 Identify basic troubleshooting techniques for pumps.
16.04 Identify basic troubleshooting techniques for drive systems.
16.05 Identify basic troubleshooting techniques for electrical circuits.
16.06 Identify basic troubleshooting techniques for hydraulics.
16.07 Identify basic troubleshooting techniques for pneumatics.
16.08 Identify basic troubleshooting techniques for PLCs.

17.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

17.01 Write logical and understandable statements, or phrases, to accurately fill out forms and documents commonly used in business and industry.
17.02 Read and interpret graphs, charts, diagrams, and tables commonly used in business and industry.
17.03 Read and follow written and oral instructions.
17.04 Answer and ask questions coherently and concisely.
17.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
17.06 Demonstrate appropriate communication skills, including telecommunications.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct a job search.
18.02 Secure information about a job.
18.03 Identify the documents that may be required for a job application.
18.04 Complete a resume.
18.05 Complete a job-application form correctly.
18.06 Demonstrate competence in job-interview techniques.
18.07 Identify or demonstrate appropriate responses to criticism from an employer, a supervisor, or other persons.
18.08 Identify acceptable work habits.
18.09 Describe how to make appropriate job changes.
18.10 Demonstrate acceptable employee health habits.
18.11 Describe the purpose of the Florida "Right-to-Know" law, as recorded in the Florida Statutes, Chapter 442.

19.0 DESCRIBE THE ROLE OF JOB OWNERSHIP AND ENTREPRENEURSHIP--The student will be able to:

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19.01 Define "entrepreneurship."
19.02 Describe the importance of entrepreneurship to the American economy.
19.03 List the advantages and disadvantages of business ownership and demonstrate ownership as an employee.
19.04 Identify the risks involved in the ownership of a business.
19.05 Identify the necessary personal characteristics and business skills of a successful entrepreneur.
19.06 Identify the need for teamwork, team roles when working in a factory or doing shift work, and team development.
19.07 Describe how attitudes toward work responsibilities, absences, and tardiness affect job success.

20.0 APPLY CUSTOMER-SERVICE SKILLS--The student will be able to:

20.01 Explain the need for customer satisfaction.
20.02 Prepare service orders properly.
20.03 Communicate solutions to customers.
20.04 Demonstrate methods of handling an irate customer.
20.05 Follow manufacturers' service manuals.
20.06 Locate parts in a printed or computerized catalog or on microfiche.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743240
Course Title: Machinery Maintenance 4
Course Credit: 1

COURSE DESCRIPTION:

This course develops the competencies of planning an elementary predictive- preventive-maintenance schedule, performing gas and arc welding, performing machine-shop operations, maintaining piping and tubing systems, troubleshooting electrical circuits, and maintaining and installing drive components in the industrial-machinery maintenance-technology industry. There is no occupational completion point associated with the completion of this course.

21.0 PLAN AN ELEMENTARY PREDICTIVE-PREVENTIVE-MAINTENANCE (PPM) SCHEDULE--The student will be able to:

21.01 List the types of predictive-preventive maintenance.
21.02 Describe the purpose of preventive-maintenance schedules.
21.03 Create a preventive-maintenance schedule form using a machine manual or the manufacturer's recommendations.
21.04 Identify troubles caused by the lack of preventive maintenance.
21.05 Create a maintenance log and make entries for a machine or equipment.
21.06 Create a preventive-maintenance schedule from a maintenance-failures log.

22.0 PERFORM GAS- AND ARC-WELDING PROCEDURES--The student will be able to:

22.01 Demonstrate the safety procedures for performing gas and arc welding and for transporting equipment.
22.02 Identify the components of an oxyfuel rig.
22.03 Set up and shut down an oxyfuel rig.
22.04 Weld beads in a flat position.
22.05 Weld an outside corner joint using a filler rod.
22.06 Cut metal of various thicknesses.
22.07 Weld beads in a flat position using E-6010 and E-7018 electrodes.
22.08 Weld beads in horizontal and in vertical positions using E-6010 and E-7018 electrodes.
22.09 Weld beads in an overhead position using E-6010 and E-7018 electrodes.
22.10 Weld beads using a mig welder.
22.11 Weld beads using a tig welder.
22.12 Solder and braze metals.
22.13 Cut stainless steel and aluminum with a plasma-arc rig.

23.0 PERFORM MACHINE-SHOP OPERATIONS--The student will be able to:

23.01 Demonstrate safety in performing machine-shop operations.
23.02 Identify the types of cutting tools.
23.03 Bore a hole to a specified size.
23.04 Chase an external V-thread.
23.05 Identify the different types of work-holding devices.
23.06 Prepare metal for finishing.
23.07 Set up, use, and adjust an arbor press.
23.08 Set up, use, and adjust a hydraulic press.
23.09 Set up, use, and adjust broaching tools.
23.10 Cut keyways with an end mill.

24.0 MAINTAIN PIPING AND TUBING SYSTEMS--The student will be able to:

24.01 Identify the components of a piping system.
24.02 Explain the maintenance considerations of metallic and nonmetallic piping systems.
24.03 Describe the safety requirements for working with piping and tubing systems.
24.04 Join copper tubing.
24.05 Join common fittings.
24.06 Join metallic pipe.
24.07 Join plastic pipe.
24.08 Explain valve operation and maintenance.
24.09 Explain the importance of strainers, filters, and traps in piping systems.
24.10 Bend back-to-back, stub-ups, and doglegs in electrical metallic tubing (EMT).

25.0 TROUBLESHOOT ELECTRICAL CIRCUITS--The student will be able to:

25.01 Describe the safety requirements and precautions for troubleshooting electrical circuits.
25.02 Disconnect and reconnect electric motors.
25.03 Identify the parts and function of electrical control equipment.
25.04 Define digital devices and PLC logic/ladder logic to troubleshoot.
25.05 Identify the function of input and output devices and the controller.
25.06 Explain how to troubleshoot a sequence of events.
25.07 Use and maintain electrical test equipment for troubleshooting.

26.0 INSTALL AND MAINTAIN DRIVE COMPONENTS--The student will be able to:

26.01 Demonstrate safety procedures for installing and maintaining drive components.
26.02 Identify types of bearings, their cross-referencing, and their uses.
26.03 Remove, inspect, and/or replace bearings.
26.04 Remove and replace seals.
26.05 Perform shaft alignment.
26.06 Identify the types of belts.
26.07 Identify the types of chains.

26.08 Perform tension adjustments and alignment on belt and chain drives.
26.09 Troubleshoot belt and chain drives.
26.10 Identify the types of gears.
26.11 Remove, replace, and align gears, sprockets, and couplings.
26.12 Remove, replace, or repair V-joints and jack shafts.
26.13 Adjust gear backlash.
26.14 Troubleshoot gear drives.
26.15 Disassemble, inspect, reassemble, and adjust clutches.
26.16 Identify the types of variable-speed drives.
26.17 Troubleshoot variable-speed drives.
26.18 Identify the types of cams and link mechanisms.
26.19 Troubleshoot cam-and-link mechanism problems.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743250
Course Title: Machinery Maintenance 5
Course Credit: 1

COURSE DESCRIPTION:

This course develops the competencies of maintaining specific types of air compressors and maintaining, repairing, and troubleshooting fluid-drive systems in the industrial-machinery maintenance-technology industry. There is no occupational completion point associated with the completion of this course.

27.0 MAINTAIN RECIPROCATING, POSITIVE-DISPLACEMENT, AND ROTARY AIR COMPRESSORS--The student will be able to:

27.01 Relate force, weight, mass, and density to a pneumatic system.
27.02 Demonstrate safety procedures for maintaining reciprocating, positive-displacement, and rotary air compressors.
27.03 Demonstrate the operation of reciprocating compressors.
27.04 Demonstrate the operation of positive-displacement and rotary air compressors.
27.05 Demonstrate primary and secondary air treatment.
27.06 Demonstrate the operation of valves, cylinders, and motors.
27.07 Check oil level.
27.08 Change oil.
27.09 Drain water from tank.
27.10 Test for efficiency of compressor.
27.11 Inspect storage tank for quality.
27.12 Test pressure control switch.

28.0 MAINTAIN AND REPAIR HYDRAULIC-SYSTEM COMPONENTS--The student will be able to:

28.01 Explain the safety procedures for installing hydraulic lines.
28.02 Explain Pascal's law.
28.03 Explain Bernoulli's principle.
28.04 Explain how heat and pressure relate to power and transmission.
28.05 Describe the physical and chemical properties of a fluid.
28.06 Install and maintain a contaminant-removal system.
28.07 Determine reservoir requirements.
28.08 Classify and select pumps for specific applications.
28.09 Compute hose requirements.
28.10 Install hydraulic lines.
28.11 Select and install control valves.

29.0 TROUBLESHOOT HYDRAULIC SYSTEMS--The student will be able to:

29.01 Explain the safety procedures for troubleshooting hydraulic systems.

29.02 Read a hydraulic schematic.
29.03 Install hydraulic components.
29.04 Connect electrically controlled valves.
29.05 Explain hydraulic-system troubleshooting techniques.
29.06 Repair and replace valves.

29.07 Repair and replace cylinders.
29.08 Repair and replace pumps and motors.

30.0 MAINTAIN AND TROUBLESHOOT PNEUMATIC SYSTEMS--The student will be able to:

30.01 Explain the safety procedures for troubleshooting pneumatic systems.
30.02 Diagram an air-supply system.
30.03 Install system components.
30.04 Demonstrate system-maintenance techniques.
30.05 Explain proper troubleshooting procedures.
30.06 Troubleshoot air compressors.
30.07 Troubleshoot, repair, and install control valves.
30.08 Troubleshoot air motors.

31.0 MAINTAIN AND TROUBLESHOOT FLUID-DRIVE SYSTEMS--The student will be able to:

31.01 Explain the safety procedures for maintaining and troubleshooting fluid-drive systems.
31.02 Install adjustable speed drives.
31.03 Troubleshoot adjustable speed drives.
31.04 Explain the operation of fluid couplings.
31.05 Install fluid couplings.
31.06 Install torque converters.
31.07 Perform preventive maintenance.
31.08 Apply a "dynamic" magnetic/mechanical braking device to a motor.
31.09 Mount the equipment.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743260
Course Title: Machinery Maintenance 6
Course Credit: 1

COURSE DESCRIPTION:

This course develops the competencies for pump maintenance and repair and for pollution control along with a knowledge of industrial-pollution control systems in industrial-machinery maintenance-technology operations. It may include the development of optional competencies related to air-conditioning and refrigeration, boilers, and small engines. Completion of this course prepares the student for ***OCCUPATIONAL COMPLETION POINT - DATA CODE B, MACHINERY MAINTENANCE MECHANIC--OES 85119632.***

32.0 PERFORM PUMP MAINTENANCE AND REPAIR--The student will be able to:

- 32.01 Demonstrate the safety procedures for performing pump maintenance.
- 32.02 Determine pump capacity and system requirements.
- 32.03 Perform pump maintenance.
- 32.04 Identify packing and seal requirements.
- 32.05 Explain the operating principles of centrifugal, propeller and turbine rotary, reciprocating, diaphragm, positive placement, and vacuum pumps.
- 32.06 Disassemble and reassemble a pump.

33.0 EXPLAIN THE OPERATION OF INDUSTRIAL-POLLUTION CONTROL SYSTEMS--The student will be able to:

- 33.01 Explain the operation of air-pollution control systems.
- 33.02 Explain the operation of water-pollution control systems.
- 33.03 Explain the operation of solid-waste pollution control systems.
- 33.04 Explain the operation of noise-pollution control systems.

34.0 TROUBLESHOOT AIR-CONDITIONING AND REFRIGERATION SYSTEMS--The student will be able to:

- 34.01 Explain the principles of refrigeration.
- 34.02 Identify the major components.
- 34.03 Describe the functions of electrical systems.
- 34.04 Troubleshoot air-conditioning and refrigeration systems.
- 34.05 Explain the requirement for recovery of hazardous materials and related safety procedures.

35.0 IDENTIFY BOILERS--The student will be able to:

- 35.01 Identify the various types and components of heat exchangers.
- 35.02 Identify the various types and components of boilers.

35.03 Identify the various types and components of fractioning columns.
35.04 Identify the uses of steam.

36.0 REPAIR AND MAINTAIN BASIC TWO-STROKE-CYCLE ENGINES--The student will be able to:

36.01 Explain the basic principles of operation of the two-stroke-cycle combustion engine.
36.02 Identify the types of engines.
36.03 Locate engine serial and model numbers.
36.04 Identify engine assemblies and systems.
36.05 Disassemble engines.
36.06 Remove, clean, and inspect the head for cracks, warpage, and damaged spark-plug threads.
36.07 Diagnose head problems by use of the visual-inspection method.
36.08 Diagnose head problems by use of the compression-tester method.
36.09 Diagnose head problems by use of the cylinder air-pressure method.
36.10 Diagnose head problems by use of the stethoscope method.
36.11 Remove, clean, and inspect piston rods and assemblies.
36.12 Measure an out-of-round piston and cylinder.
36.13 Hone cylinders as required by the manufacturer's specifications.
36.14 Check the total bearing surface of connecting rod bearings.
36.15 Measure piston skirts and ring grooves.
36.16 Measure the piston-ring gap in the cylinder bore.
36.17 Install piston pins according to the manufacturer's specifications.
36.18 Check the rod-and-piston assembly alignment.
36.19 Install rings on pistons.
36.20 Install rod-and-piston assemblies.
36.21 Check needle bearings.
36.22 Measure and check crankshafts with a micrometer to diagnose engine problems.
36.23 Inspect crankshafts and install seals.
36.24 Inspect, clean, and/or replace reed valves.
36.25 Reassemble engines.

37.0 REPAIR AND MAINTAIN BASIC FOUR-STROKE-CYCLE ENGINES--The student will be able to:

37.01 Explain the basic principles of operation of the four-stroke-cycle internal-combustion engine.
37.02 Identify the types of four-stroke-cycle engines.
37.03 Locate engine serial and model numbers.
37.04 Identify engine assemblies and systems.
37.05 Diagnose valve and head problems by use of the visual-inspection method, i.e., water contamination v. fuel-rich or lean carburetor adjustment.
37.06 Diagnose valve and head problems by use of the compression-tester method.
37.07 Diagnose valve and head problems by use of the cylinder air-pressure method.

37.08 Diagnose valve and head problems by use of the stethoscope method.
37.09 Disassemble engines.
37.10 Clean and inspect heads for cracks, warpage, and damaged spark-plug threads.
37.11 Inspect valves for warpage, burns, cracks, stem wear, time wear, and margin.
37.12 Grind valve seats and reface valves.
37.13 Check and inspect springs for free height, distortion, and installed height.
37.14 Adjust a valve lash.
37.15 Remove and inspect camshafts and lifters.
37.16 Measure camshafts.
37.17 Service camshaft bearings.
37.18 Clean and inspect lifters for wear.
37.19 Time valve-drive assemblies.
37.20 Remove the piston from rod assemblies.
37.21 Measure piston out-of-round and cylinder taper with a dial bore gauge or micrometer.
37.22 Check piston pins and bosses for wear.
37.23 Measure piston ring lands width, out-of-round, and taper.
37.24 Measure the piston-ring gap in the cylinder bore.
37.25 Install and fit piston pins.
37.26 Check the rod-and-piston assembly alignment.
37.27 Remove and replace rod bearings.
37.28 Hone and clean cylinders.
37.29 Install rings on pistons.
37.30 Measure and check crankshafts with a micrometer.
37.31 Check for end play.
37.32 Check the bearing bore with a telescoping gauge using special tools provided by the engine manufacturer.
37.33 Reassemble engines.
37.34 Install oil seals.

38.0 REPAIR AND MAINTAIN DIESEL ENGINES--The student will be able to:

38.01 Identify diesel-engine construction, the types of engines, and the principles of operation (two- and four-stroke).
38.02 Troubleshoot and repair cooling systems.
38.03 Troubleshoot and repair lubrication systems.
38.04 Troubleshoot and repair induction and exhaust systems.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743170
Course Title: Industrial Machinery Maintenance 7
Course Credit: 1

COURSE DESCRIPTION:

This course develops the competencies for preparing for machinery startup and performing vibration analysis and machine balancing for specialized operations in the industrial-machinery maintenance-technology industry. There is no occupational completion point associated with the completion of this course.

39.0 PREPARE FOR MACHINERY STARTUP--The student will be able to:

39.01 Describe the requirements and precautions for machinery startup.
39.02 Align machinery using wire line, transit, dial indicators, a computer, and laser-alignment devices.
39.03 Position and secure machinery on a foundation.
39.04 Level machinery and install balance-vibration dampeners.
39.05 Identify pipe-stress standards for machine-maintenance applications.
39.06 Perform finish alignment and check for pipe stresses in machinery- maintenance applications.

40.0 APPLY VIBRATION-ANALYSIS SKILLS--The student will be able to:

40.01 Collect vibration data.
40.02 Interpret vibration data.
40.03 Determine velocity, acceleration, spike energy, frequency, amplitude, and other vibration sources.
40.04 Describe the safety requirements and precautions for vibration analysis.
40.05 Operate and use vibration software.
40.06 Predict and verify the condition of machinery in an industrial setting using vibration tools.
40.07 Explain the approximately 25 sources of vibration.
40.08 Explain the bearing frequency (BIFO) formulas.
40.09 Demonstrate proficiency in vibration detection.

41.0 PERFORM MACHINERY BALANCING--The student will be able to:

41.01 Describe the safety requirements and precautions for balancing procedures and equipment.
41.02 Identify the principles of static balancing.
41.03 Perform a vector balance in the classroom.
41.04 Identify balancing standards, ISO 1940 or equal.
41.05 Perform a stand balance in a shop.
41.06 Perform a field balance in an industrial setting.

41.07 Use portable or stationary balancing equipment.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743180
Course Title: Industrial Machinery Maintenance 8
Course Credit: 1

COURSE DESCRIPTION:

This course develops the competencies for using predictive-preventive-maintenance technologies and computer-maintenance management systems and for performing failure analysis for the specialized operations in the industrial- machinery maintenance-technology industry. There is no occupational completion point associated with the completion of this course.

42.0 DEMONSTRATE PREDICTIVE-PREVENTIVE-MAINTENANCE (PPM) TECHNOLOGIES--The student will be able to:

- 42.01 Explain the use of infrared thermography.
- 42.02 Explain the use of ultrasound technology.
- 42.03 Explain the use of advanced alignment techniques (optical and Essinger bars).
- 42.04 Explain the use of oil ferrography and the types of oil sampling.
- 42.05 Explain the use of shock pulse equipment.
- 42.06 Describe the safety requirements for PPM technologies.
- 42.07 Demonstrate the use of one of the above predictive-maintenance procedures.
- 42.08 Plan an advanced PPM schedule.

43.0 USE COMPUTER-MAINTENANCE-MANAGEMENT SYSTEMS (CMMS)--The student will be able to:

- 43.01 Operate CMMS software.
- 43.02 Enter and close a maintenance work order with CMMS.
- 43.03 Schedule a series of maintenance tasks.
- 43.04 Write a detailed maintenance job plan.
- 43.05 Order parts and supplies for a maintenance work order.
- 43.06 Determine the personnel resources needed for a maintenance job.

44.0 PERFORM FAILURE ANALYSIS (FA)--The student will be able to:

- 44.01 Conduct/lead a failure-analysis meeting to determine the root cause of a failure.
- 44.02 Create a failure-analysis form and write a minimum of two different types of failure-analysis reports.
- 44.03 Explain the types of bearing failures.
- 44.04 Explain the types of shaft fatigues and failures.
- 44.05 Explain the types of lubrication breakdowns.
- 44.06 Estimate the cost and the impact on production of a specific failure.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8743190
Course Title: Industrial Machinery Maintenance 9
Course Credit: 1

COURSE DESCRIPTION:

This course develops the competencies for improving the performance of rotating equipment, machines, and maintenance management for specialized operations in the industrial-machinery maintenance-technology industry. Completion of this course prepares the student for ***OCCUPATIONAL COMPLETION POINT - DATA CODE C, INDUSTRIAL MACHINERY MAINTENANCE AND REPAIR SPECIALIST***--Industry Title.

45.0 IMPROVE ROTATING-EQUIPMENT PERFORMANCE--The student will be able to:

- 45.01 Calculate shaft-deflection ratios and use the results to improve shaft design.
- 45.02 Draw or sketch equipment bases and supports of sturdy construction.
- 45.03 Demonstrate and install advanced labyrinth-sealing devices.
- 45.04 Demonstrate and install advanced mechanical-sealing devices.
- 45.05 Run the Gates Belts or another interactive belt-design-and-tensioning computer program applied to various drives.
- 45.06 Explain the benefits of synthetic oils and greases.
- 45.07 Explain MTBF (mean time between equipment failure) and its cost impact when machinery life is extended.
- 45.08 List seven specific machinery-improvement ideas in detail.

46.0 GENERATE MACHINE IMPROVEMENTS AND MAINTENANCE MANAGEMENT--The student will be able to:

- 46.01 Review and critique machinery and base design for improvement, before the equipment is placed on order.
- 46.02 Identify the essential elements of effective maintenance management:
  - a. reward system
  - b. predictive-preventive maintenance
  - c. planning
  - d. work-order systems
  - e. organizations
  - f. goals and tracking
  - g. facilities
  - h. storerooms
  - i. contractors
  - j. shutdowns
- 46.03 Write a report on the design and effective use of at least two of the essential elements of management.

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Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Industrial Management Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0606.200101
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for initial employment with an occupational title as industrial manager, or to provide supplemental training for persons previously or currently employed in these occupations.

The content should include, but not be limited to, communication skills, leadership skills, human relations and employability skills, principles of management, personnel management, and general business procedures.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Industrial Management industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **PROGRAM STRUCTURE:** This Associate of Science Degree Program contains at least 15 credit hours of general education, 21 credit hours of management or business related courses and professional electives which may include industrial, technical or related professional courses. The total Associate in Science degree program includes 60 credit hours.

Students enrolling in this program must meet the minimum skills requirements in writing, reading and mathematics as stipulated in State Board of Education Rule 6A-10.315.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

III. **SPECIAL NOTE:** None.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Apply supervision skills.
02.0 Communicate effectively in supervision.
03.0 Manage human behavior.
04.0 Motivate one's self.
05.0 Motivate others.

06.0 Apply strategies for effective management.
07.0 Utilize creative thinking to achieve business objectives.
08.0 Apply basic decision making skills in supervision.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate appropriate math skills.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate employability skills.
13.0 Demonstrate an understanding of entrepreneurship.
14.0 Demonstrate knowledge of data processing activities.
15.0 Identify, classify, and demonstrate management functions.
16.0 Develop human relations skills.
17.0 Apply basic quality control principles.
18.0 Demonstrate an understanding of technical or industrial competencies.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Industrial Management Technology
Secondary Number:
Postsecondary Number: 0606.200101

01.0 APPLY SUPERVISION SKILLS--The student will be able to:

- 01.01 Specify the responsibilities of the supervisor.
- 01.02 Practice human relations skills.
- 01.03 Follow leadership principles and approaches.
- 01.04 Apply positive approaches to discipline.
- 01.05 Conceptualize organizational functions of management.
- 01.06 Develop organizational plans.
- 01.07 Follow and teach accepted accident prevention practices.
- 01.08 Apply elements of delegation.
- 01.09 Coordinate employee and organization interest.
- 01.10 Apply techniques of dealing with crisis.
- 01.11 Utilize strategies for dealing with interpersonal conflicts.
- 01.12 Analyze causes of resistance in employees.
- 01.13 Implement the agreement finding process.
- 01.14 Develop and implement job instructions.
- 01.15 Apply delegation procedures.
- 01.16 Apply principles of management to employee/employer conflicts.

02.0 COMMUNICATE EFFECTIVELY IN SUPERVISION--The student will be able to:

- 02.01 Solve problems in communicating.
- 02.02 Exhibit appropriate habits in person to person communication.
- 02.03 Apply listening skills.
- 02.04 Use communication feedback effectively.
- 02.05 Use persuasion skills in communicating.
- 02.06 Build credibility in management.
- 02.07 React to non-verbal communication.
- 02.08 Practice confrontation skills.
- 02.09 Write an effective memorandum.
- 02.10 Prepare a written technical report.

03.0 MANAGE HUMAN BEHAVIOR--The student will be able to:

- 03.01 Use behavior modification techniques.
- 03.02 Practice transactional analysis skills.
- 03.03 Establish goals and objectives.
- 03.04 Identify and resolve emotional disturbances of workers.
- 03.05 Use self concept building skills.
- 03.06 Assess worker and supervisor roles and relationships.
- 03.07 Manage worker resistance to change.
- 03.08 Diagnose the dynamics involved in performance appraisal.
- 03.09 Use appropriate assertiveness skills.

04.0 MOTIVATE ONE'S SELF--The student will be able to:

04.01 Build improved attitude and self-confidence.
04.02 Conceptualize cause and effect relationship.
04.03 Set personal goals.
04.04 Apply self-esteem building skills.
04.05 Diagnose life traps.
04.06 Apply self-discipline techniques.
04.07 Determine areas of personal talent.

05.0 MOTIVATE OTHERS--The student will be able to:

05.01 Conceptualize the self-fulling prophesy.
05.02 Conceptualize the process of motivation.
05.03 Apply the hierarchy of human needs to worker motivation.
05.04 Effect job enrichment procedures.
05.05 Apply attitude enrichment procedures.
05.06 Conceptualize concept of maintainers and motivators.
05.07 Develop role of trust and credibility in worker motivation.
05.08 Direct Goal-setting procedures with workers.
05.09 Implement participative style of supervision.

06.0 APPLY STRATEGIES FOR EFFECTIVE MANAGEMENT--The student will be able to:

06.01 Diagnose unacceptable performance.
06.02 Determine effective discipline procedures.
06.03 Undertake disciplinary action.
06.04 Plan appraisal interviews.
06.05 Conduct appraisal interviews.
06.06 Implement transfer, demotion and termination procedures.
06.07 Conduct hiring interviews.
06.08 Implement recruitment procedures.

07.0 UTILIZE CREATIVE THINKING TO ACHIEVE BUSINESS OBJECTIVES--The student will be able to:

07.01 Conduct and apply techniques for maximum production of ideas.
07.02 Maintain conditions necessary for creative problem solving.
07.03 Diagnose conditions antithetical to creativity.
07.04 Oversee problem solving.

08.0 APPLY BASIC DECISION MAKING SKILLS IN SUPERVISION--The student will be able to:

08.01 Conduct decision making meetings.
08.02 Employ steps of effective decision making.
08.03 Maintain conditions for effective decision making.
08.04 Set goals and objectives.
08.05 Evaluate job applicants.
08.06 Select the best ways to discipline an employee.
08.07 Select tasks to delegate.
08.08 Discuss the performance appraisal of an employee with him/her.
08.09 Select the employee to promote.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Identify documents which may be required when applying for a job interview.
12.04 Complete a job application for correctly.
12.05 Demonstrate competence in job interview techniques.
12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
12.07 Identify acceptable work habits.
12.08 Demonstrate knowledge or how to make appropriate job changes.
12.09 Demonstrate acceptable employee health habits.
12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Identify characteristics of the American enterprise system.
13.02 Define inflation and deflation.
13.03 Illustrate the basic economic questions facing any society.
13.04 Determine the results of a change in demand or a change in supply
13.05 List factors which contribute to economic growth.
13.06 Identify characteristics of different types of business ownership.
13.07 Choose appropriate action in a situation requiring application of business ethics.

14.0 DEMONSTRATE KNOWLEDGE OF DATA PROCESSING ACTIVITIES--The student will be able to:

14.01 Identify terms commonly used in information processing.
14.02 Identify automated business systems, equipment components, and media.
14.03 Sequence and define the six steps of a procession cycle.
14.04 Interpret operations of a flowchart of a simulated business job.
14.05 Check printout for error, correct, and resubmit.
14.06 Use an alphanumeric keyboard and a ten-key numeric pad with appropriate techniques.

15.0 IDENTIFY, CLASSIFY, AND DEMONSTRATE MANAGEMENT FUNCTIONS--The student will be able to:

15.01 Identify the correct definition of management.
15.02 Identify management positions and styles.
15.03 Identify the major functions of management.
15.04 Classify activities as part of the planning function of management.
15.05 Classify activities as part of the organizing function of management.
15.06 Classify activities as part of the staffing function of management.
15.07 Classify activities as part of the directing function of management.
15.08 Classify activities as part of the controlling function of management.
15.09 Distinguish among management functions.
15.10 Select the most effective communication systems.

16.0 DEVELOP HUMAN RELATIONS SKILLS--The student will be able to:

16.01 Demonstrate appropriate work habits.
16.02 Identify behavior that promotes good human relations.

17.0 APPLY BASIC QUALITY CONTROL PRINCIPLES--The student will be able to:

17.01 Interpret basic statistical process control charts.

17.02 Apply basic statistical process control principles.
17.03 Analyze workers' and inspectors' roles in quality production.
17.04 Conduct a quality circle work session.

18.0 DEMONSTRATE AN UNDERSTANDING OF TECHNICAL OR INDUSTRIAL COMPETENCIES--
The student will be able to:

18.01 Demonstrate an understanding of technical or industrial competencies as specified in the curriculum frameworks of any postsecondary adult or postsecondary vocational program.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Industrial Plastics
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I480604**
CIP Number	0648.060400
Grade Level	30, 31
Length	1200 hours
Certification	IND PLASTI @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as extruding machine operators (91311793), plastic bench mechanics (754.381-018), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, molding and casting plastic parts, patterns, and prototype parts, and fitting, fabricating, assembling, finishing, and repairing of plastic parts and components.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Plastics industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in mold construction parts fabrication, assembly, and finishing; and the processes to produce both component parts and finished plastic products.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 8.0, Language 8.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1200 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate understanding of procedures and safe work practices.
02.0 Read blueprints, schematics, and diagrams.
03.0 Draw and lay out prototype products.
04.0 Build molds and patterns.
05.0 Manufacture component parts.
06.0 Construct and finish plastic products.
07.0 Repair plastic products.
08.0 Use and maintain hand and power tools.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate appropriate math skills.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate employability skills.
13.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Industrial Plastics
Secondary Number:
Postsecondary Number: I480604

01.0 DEMONSTRATE AN UNDERSTANDING OF PROCEDURES AND SAFE WORK PRACTICES--The student will be able to:

01.01 Demonstrate an awareness and understanding of health and safety hazards, prevention, correction and ecological problems and solutions unique to quality control and reliability processes and systems.
01.02 Demonstrate an understanding of physical hazards.
01.03 Demonstrate an understanding of chemical hazards.
01.04 Demonstrate an understanding of biological and biomechanical hazards.
01.05 Demonstrate an awareness and understanding of fire hazards in manufacturing, processing, and fabrication.
01.06 Demonstrate an understanding of the procedures used to control and extinguish NFPA classes of fires.
01.07 Demonstrate an awareness and understanding for the need and use of safety devices, controls, guards and equipment.
01.08 Demonstrate awareness, understanding and use of personal safety protection and devices including but not limited to goggles, safety glasses, masks, helmets, hearing protectors, air respirators, protective clothing, safety shoes and mesh gloves.
01.09 Demonstrate administration of first aid procedures and accident procedures.
01.10 Demonstrate an awareness and understanding of applicable OSHA rules and regulations.

02.0 READ BLUEPRINTS, SCHEMATICS, AND DIAGRAMS--The student will be able to:

02.01 Use working drawings which include detail and assembly drawings.
02.02 Demonstrate the ability to use and interpret information on exterior views, sectional views, auxiliary views, balloon drawings, pictorial drawings, exploded views, perspective drawings and projection drawings.
02.03 Demonstrate the ability to determine accuracy of information on working drawings.
02.04 Demonstrate the ability to perform mathematical calculations utilizing arithmetic, algebra, geometry and trigonometry.
02.05 Demonstrate the ability to read and convert English system and metric system measurements.
02.06 Demonstrate the ability to use decimal metric equivalents charts, tap drill sizes for American standards threads charts drill size decimal equivalent charts, American standard wrench nuts and bolts charts, mechanical fasteners charts and assembly devices charts.
02.07 Demonstrate the ability to use measuring tools and scales.

02.08 Demonstrate the ability to take off materials list from working drawings calculate totals for production.

03.0 DRAW AND LAY OUT PROTOTYPE PRODUCTS--The student will be able to:

03.01 Prepare multi-view drawings.
03.02 Prepare sectional drawings.
03.03 Prepare auxiliary.
03.04 Prepare pictorial drawings.
03.05 Prepare take-off detail drawings.
03.06 Prepare surface developments.
03.07 Prepare a complete set of working drawings including detail and assembly drawings which supply every item of information for the manufacture and assembly of the product represented.
03.08 Prepare a complete set of working drawings manually and using CAD systems. (The CAD systems drawings and program shall be capable of interfacing to drive CADCAM and CAM manufacturing equipment.)
03.09 Demonstrate necessary design considerations for functional working drawings, i. e. appearance, chemical characteristics, mechanical factors, economics, process of manufacture and design limitations.

04.0 BUILD MOLDS AND PATTERNS--The student will be able to:

04.01 Demonstrate an understanding of requirements to design and apply dies, molds and patterns to the following processes: injection molding, cut extrusions, sheet moldings (vacuum forming and mechanical forming), blow moldings, slush, rotational and dip castings, compression moldings, transfer moldings, reinforced plastics moldings (contact, vacuum bag, pressure bag, autoclave, matched die, filament wound and spray molding), castings and cold moldings.
04.02 Demonstrate an understanding of appropriate materials and tools used for making dies, molds and patterns dependent upon the plastic material to be processed or manufactured.
04.03 Demonstrate an understanding of processes and machines required to make a die, mold or pattern, i. e. milling, turning, drilling, boring, grinding, hobbing, casting, planing, etching, electro-forming, electrical-discharge machining, plating, welding and shaping.
04.04 Design products which can be injection molded.
04.05 Design and construct molds for injection molding of product design above.
04.06 Design products which can be produced by extrusion.
04.07 Design and construct dies to produce various extrusion shapes.
04.08 Design product that can be blow-molded.
04.09 Design and construct molds for products produced using the blow-mold process.
04.10 Design products which are vacuum formed.
04.11 Design patterns and molds to produce products using the vacuum forming process.
04.12 Design products which are pressure formed.
04.13 Design and construct pressure forming molds.

04.14 Design products which are formed by slush, rotational or dip casting.

04.15 Design and construct molds to produce products utilizing slush, rotational and dip casting processes.

04.16 Design products which are compression model.

04.17 Design and construct molds which are used to produce products utilizing the compression molding process.

04.18 Design products which utilize contact, vacuum bag, pressure bag, autoclave, matched die, filament wound and spray processes.

04.19 Design and construct molds to produce products using contact, vacuum bag, pressure bag, autoclave, matched die, filament wound and spray molding processes.

05.0 MANUFACTURE COMPONENT PARTS--The student will be able to:

05.01 Demonstrate the ability to select and use molds, patterns, dies, raw materials, measuring and weighing devices, hand tools, fixed equipment, portable equipment and safe procedures to manufacture plastic component parts.

05.02 Manufacture finished plastic parts or products which utilize the following processes: injection molding, extrusion, bow molding, vacuum forming, pressure forming, slush forming, rotational forming, dip casting, compression molding, and contact, vacuum bag, pressure bag, autoclave, matched die, filament wound processes.

06.0 CONSTRUCT AND FINISH PLASTIC PRODUCTS--The student will be able to:

06.01 Demonstrate an understanding of processes, tools, materials and machines necessary to finish and assemble plastic products.

06.02 Demonstrate the ability to finish and assemble plastic products using the following processes: flash removal, slot cutting, polishing, annealing, sawing, filing, drilling, tapping, turning, planing, milling, shaping, routing, sanding, shearing, punching, laser cutting, tumbling, grinding, ashing, buffing, polishing, transparent coating, polishing by solvents, annealing, and post-curing.

07.0 REPAIR PLASTIC PRODUCTS--The student will be able to:

07.01 Demonstrate an understanding of types of repairs which can be performed on various types and classes of plastic products.

07.02 Demonstrate an understanding of types of products which can be used to perform successful repairs.

07.03 Demonstrate an understanding of appropriate tools, machines and processes which can be used to perform successful repairs on plastic products.

07.04 Demonstrate repairs to plastic products using the following processes: cohesive cementing, solvent cementing, mechanical fastening, stapling, snap fit, press fit, heat staking, ultrasonic staking, thermal sealing, impulse sealing ultrasonic sealing, dielectric sealing, hot gas welding, spin welding, hot

plate welding, ultrasonic welding, hot blade welding, high pressure lamination.

08.0 USE AND MAINTAIN HAND AND POWER TOOLS--The student will be able to:

- 08.01 Demonstrate an understanding of care and maintenance of hand tools.
- 08.02 Demonstrate the safe us of hand tools.
- 08.03 Demonstrate an understanding of care, adjustment and maintenance of fixed and portable power tools.
- 08.04 Demonstrate an understanding of care, adjustment, control, and maintenance of production machines.
- 08.05 Demonstrate the safe use of hand tools, power tools, and production machines to produce products or parts utilizing the processes identified in 05.0, 06.0, and 07.0 above.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 09.03 Read and follow written and oral instructions.
- 09.04 Answer and ask questions coherently and concisely.
- 09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 11.02 Draw conclusions or make inferences from data.
- 11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 11.04 Understand pressure measurement in terms of P.S.I., inches of mercury and K.P.A.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Identify documents which may be required when applying for a job interview.
12.04 Complete a job application form correctly.
12.05 Demonstrate competence in job interview techniques.
12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
12.07 Identify acceptable work habits.
12.08 Demonstrate knowledge of how to make appropriate job changes.
12.09 Demonstrate acceptable employee health habits.
12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.
13.05 Identify the necessary personal characteristics of a successful entrepreneur.
13.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Industrial Technology
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I150603**
CIP Number	0615.060300
Grade Level	30, 31
Length	1620 hours
Certification	IND ENGR @7 G

I. **MAJOR CONCEPTS CONTENT**: The purpose of this program is to prepare students for employment as industrial engineering technicians (22508235), (012.267-010) or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, production and planning, design and installation of integrated systems and measurement, testing, and management of quality control in the manufacturing, transportation, assembly, installation, and operation of processes and products.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Industrial industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Shop or laboratory activities are an integral part of this program and provide instruction in the operation of destructive and nondestructive testing equipment, measuring devices, specification reading, and design and measurement for levels of tolerance acceptable with overall specifications.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has

chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 9.0, Language 9.0, Reading 8.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1620 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Prepare charts, graphs and diagrams.
02.0 Conduct time, motion, and cost control studies.
03.0 Determine estimates for tools, materials and supplies.
04.0 Sequence operations for fabrication and assembly of products.
05.0 Discuss manufacturing control procedures.
06.0 Read and interpret blueprints, schematics, and diagrams.
07.0 Demonstrate understanding of mechanics, hydraulics and schematics theory.
08.0 Demonstrate understanding of automated manufacturing processes.
09.0 Read, interpret, and write technical reports.
10.0 Demonstrate management skills.
11.0 Demonstrate appropriate communication skills.
12.0 Demonstrate appropriate math skills.
13.0 Demonstrate appropriate understanding of basic science.
14.0 Demonstrate employability skills.
15.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Industrial Technology
Secondary Number:
Postsecondary Number: I150603

01.0 PREPARE CHARTS, GRAPHS, AND DIAGRAMS--The student will be able to:

- 01.01 Gather pertinent information for representation.
- 01.02 Utilize design tools to draw.
- 01.03 Evaluate information for description.
- 01.04 Free sketch draft of diagram.
- 01.05 Determine most effective means of representation.
- 01.06 Develop accurate information/representation to scale.

02.0 CONDUCT TIME, MOTION, AND COST CONTROL STUDIES--The student will be able to:

- 02.01 Develop employee job requirements.
- 02.02 Analyze time spent on individual tasks.
- 02.03 Develop cost control data.
- 02.04 Evaluate production methods.
- 02.05 Generate specific job requirements.
- 02.06 Complete job status reports.

03.0 DETERMINE ESTIMATES FOR TOOLS, MATERIALS AND SUPPLIES--The student will be able to:

- 03.01 Analyze production tooling and materials needs.
- 03.02 Identify prospective suppliers.
- 03.03 Obtain bids for purchase.
- 03.04 Prepare and issue purchase requisition.
- 03.05 Receive and inspect materials.
- 03.06 Average distribution of materials based on need.

04.0 SEQUENCE OPERATIONS FOR FABRICATION AND ASSEMBLY OF PRODUCTS--The student will be able to:

- 04.01 Analyze product components.
- 04.02 Determine most effective production system.
- 04.03 Evaluate time requirements at each production step.
- 04.04 Determine tool, supply, and material needs at each work station.
- 04.05 Lay out work procedures and stations.

05.0 DISCUSS MANUFACTURING CONTROL PROCEDURES--The student will be able to:

- 05.01 Evaluate motivation, production, quality and cost in planning efficiency.
- 05.02 Apply inspection processes in systems.
- 05.03 Implement quality control procedures.
- 05.04 Analyze workers and inspectors roles in quality production.

05.05 Plan trial run and production run.

06.0 READ AND INTERPRET BLUEPRINTS, SCHEMATICS, AND DIAGRAMS--The student will be able to:

06.01 Read detailer shop drawings.
06.02 Read assembly drawings.
06.03 Interpret sectional drawings.
06.04 Read and interpret dimensions by tolerance.
06.05 Identify symbols and abbreviations.

07.0 DEMONSTRATE UNDERSTANDING OF MECHANICS, HYDRAULICS AND SCHEMATICS THEORY--The student will be able to:

07.01 Demonstrate an understanding of measuring systems and ratios.
07.02 Locate the center of gravity of a mass.
07.03 Explain working forces of torque, tension, and compression.
07.04 Explain the laws of motion.
07.05 Explain how to calculate work.
07.06 Explain the function of simple machines including levers, inclined plane, wedge wheel and axle, pulley and screw.
07.07 Explain the types of power and the method of producing power including compound gears.
07.08 Calculate volume mathematically and by displacement.
07.09 Explain the laws of friction.
07.10 Identify common schematic symbols and diagrams.
07.11 Diagram an air supply system.
07.12 Install system components.
07.13 Explain system maintenance techniques.
07.14 Explain proper troubleshooting procedures.
07.15 Read a hydraulic schematic.
07.16 Identify hydraulic components.
07.17 Explain hydraulic system troubleshooting techniques.
07.18 Relate force, weight, mass and density to a pneumatic system.
07.19 Explain the operation of reciprocating compressors.
07.20 Explain the operation of positive-displacement rotary compressors.
07.21 Explain primary and secondary air treatment.
07.22 Explain the operation of valves, cylinders, and motors.

08.0 DEMONSTRATE UNDERSTANDING OF AUTOMATED MANUFACTURING PROCESSES--The student will be able to:

08.01 Analyze and evaluate transducers.
08.02 Analyze motor control systems.
08.03 Analyze synchros and resolvers.
08.04 Analyze pulse encoders.
08.05 Analyze farred scales.

09.0 READ, INTERPRET, AND WRITE TECHNICAL REPORTS--The student will be able to:

09.01 Draw and interpret schematics.
09.02 Record data.

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09.03 Write reports.
09.04 Maintain test logs.
09.05 Compose technical letters.

10.0 DEMONSTRATE MANAGEMENT SKILLS--The student will be able to:

10.01 Write and process production orders.
10.02 Select and care for materials.
10.03 Evaluate employee performance.
10.04 Prepare reports and technical data.
10.05 Perform production analysis.
10.06 Evaluate productivity of process.
10.07 Schedule production.
10.08 Perform station inspections.

11.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

11.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
11.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
11.03 Read and follow written and oral instructions.
11.04 Answer and ask questions coherently and concisely.
11.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
11.06 Demonstrate appropriate telephone/communication skills.

12.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

12.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
12.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
12.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
12.05 Demonstrate an understanding of federal, state and local taxes and their computation.

13.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

13.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
13.02 Draw conclusions or make inferences from data.
13.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
13.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

14.01 Conduct a job search.
14.02 Secure information about a job.
14.03 Identify documents which may be required when applying for a job interview.
14.04 Complete a job application form correctly.
14.05 Demonstrate competence in job interview techniques.
14.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
14.07 Identify acceptable work habits.
14.08 Demonstrate knowledge of how to make appropriate job changes.
14.09 Demonstrate acceptable employee health habits.
14.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

15.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

15.01 Define entrepreneurship.
15.02 Describe the importance of entrepreneurship to the American economy.
15.03 List the advantages and disadvantages of business ownership.
15.04 Identify the risks involved in ownership of a business.
15.05 Identify the necessary personal characteristics of a successful entrepreneur.
15.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Instrument Repair
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I470401**
CIP Number	0647.040100
Grade Level	30, 31
Length	1400 hours
Certification	INSTRMENT @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as precision instrument repairers (85905660), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, maintenance and repair of meters, measuring devices, and control devices, dial pressure gauges, electrical controlling, measuring and recording devices, and optical, aeronautical and navigational instruments.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Instrument Repair industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in AC and DC circuit operation, reading and interpretation of blueprints, schematics and diagrams and operation of electrical, thermal, pneumatic and hydraulic test instruments to repair and maintain meters, measuring and control devices.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has

chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 10.0, Language 8.0, Reading, 8.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1400 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in laboratory practices.
02.0 Demonstrate proficiency in DC circuits.
03.0 Demonstrate proficiency in AC circuits.
04.0 Demonstrate proficiency in solid state devices.
05.0 Demonstrate proficiency in analog circuits.
06.0 Demonstrate proficiency in digital circuits.
07.0 Demonstrate proficiency in microprocessor circuits.
08.0 Demonstrate proficiency in technical recording and reporting.
09.0 Demonstrate proficiency in hydraulic and pneumatic test instruments.
10.0 Demonstrate proficiency in thermal test instruments.
11.0 Demonstrate proficiency in meter testing.
12.0 Demonstrate appropriate communication skills.
13.0 Demonstrate appropriate math skills.
14.0 Demonstrate appropriate understanding of basic science.
15.0 Demonstrate employability skills.
16.0 Demonstrate an understanding of entrepreneurship.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Instrument Repair
Secondary Number:
Postsecondary Number: I470401

01.0 DEMONSTRATE PROFICIENCY IN LABORATORY PRACTICES--The student will be able to:

- 01.01 Apply proper OSHA safety standards.
- 01.02 Make electrical connections.
- 01.03 Identify and use hand tools properly.
- 01.04 Identify and use power tools properly.
- 01.05 Demonstrate acceptable soldering and desoldering techniques.

02.0 DEMONSTRATE PROFICIENCY IN DC CIRCUITS--The student will be able to:

- 02.01 Solve algebraic problems to include exponentials (prerequisite to DC).
- 02.02 Solve problems in electronic units utilizing metric prefixes.
- 02.03 Relate electricity to the nature of matter.
- 02.04 Identify sources of electricity.
- 02.05 Define voltage, current, resistance, power, and energy.
- 02.06 Apply Ohm's law and power formulae.
- 02.07 Read and interpret color codes and symbols to identify electrical components and values.
- 02.08 Measure properties of a circuit using VOM and DVM meters and oscilloscopes.
- 02.09 Compute and measure conductance and resistance of conductors and insulators.
- 02.10 Apply Ohm's law to series circuits.
- 02.11 Construct and verify operation and series circuits.
- 02.12 Analyze and troubleshoot series circuits.
- 02.13 Apply Ohm's law to parallel circuits.
- 02.14 Construct and verify the operation of parallel circuits.
- 02.15 Analyze and troubleshoot parallel circuits.
- 02.16 Apply Ohm's law to series-parallel parallel-series circuits.
- 02.17 Construct and verify the operation of series-parallel parallel-series and bridge circuits.
- 02.18 Troubleshoot series-parallel parallel-series and bridge circuits.
- 02.19 Identify and define voltage divider circuits (loaded and unloaded).
- 02.20 Construct and verify the operation of voltage divider circuits (loaded and unloaded).
- 02.21 Analyze and troubleshoot voltage divider circuits (loaded and unloaded).
- 02.22 Apply maximum power transfer theory.
- 02.23 Construct and verify the operation of DC circuits that demonstrate the maximum power transfer theory.
- 02.24 Describe magnetic properties and circuits and devices.

02.25 Determine and physical and electrical characteristics of capacitors and inductors.
02.26 Define RC and RL time constants and classify the output of differentiators and integrators.
02.27 Set up and operate power supplies for DC circuits.

03.0 DEMONSTRATE PROFICIENCY IN AC CIRCUITS--The student will be able to:

03.01 Solve basic trigonometric problems as applicable to electronics (prerequisite to AC).
03.02 Identify properties of an AC signal.
03.03 Identify AC sources.
03.04 Analyze and measure AC signals utilizing VOM, DVM, oscilloscope, frequency counter, and function generator.
03.05 Define the characteristics of AC capacitive circuits.
03.06 Construct and verify the operation of AC capacitive circuits.
03.07 Analyze and troubleshoot AC capacitive circuits.
03.08 Define the characteristics of AC inductive circuits.
03.09 Construct and verify the operation of AC inductive circuits.
03.10 Analyze and troubleshoot AC inductive circuits.
03.11 Define and apply the principles of transformers to AC.
03.12 Construct and verify the operation of AC circuits utilizing transformers.
03.13 Analyze and troubleshoot AC circuits utilizing transformers.
03.14 Construct and verify the operation of differentiators and integrators to determine RC and RL time constants.
03.15 Analyze and troubleshoot differentiator and integrator circuits.
03.16 Define the characteristics of RLC circuits (series, parallel, and complex).
03.17 Construct and verify the operation of RLC circuits (series, parallel, and complex).
03.18 Define the characteristics of series and parallel resonant circuits.
03.19 Construct and verify the operation of series and parallel resonant circuits.
03.20 Analyze and troubleshoot RC, RL, and RLC circuits.
03.21 Define the characteristics of frequency selective filter circuits.
03.22 Construct and verify the operation of frequency selective filter circuits.
03.23 Analyze and troubleshoot frequency selective filter circuits.
03.24 Define the characteristics of polyphase circuits.
03.25 Define basic motor theory and operation.
03.26 Define basic generator theory and operation.
03.27 Set up and operate power supplies for AC circuits.
03.28 Analyze and measure power in AC circuits.
03.29 Set up and operate capacitor/inductor analyzers for AC circuits.

04.0 DEMONSTRATE PROFICIENCY IN SOLID-STATE DEVICES--The student will be able to:

04.01 Identify and define properties of semiconductor materials.

04.02 Identify and define operating characteristics and applications of junction diodes.
04.03 Identify and define operating characteristics and applications of special diodes.
04.04 Construct diode circuits.
04.05 Analyze and troubleshoot diode circuits.
04.06 Identify and define operating characteristics and applications of bipolar transistors.
04.07 Identify and define operating characteristics and applications of field effect transistors (FET's).
04.08 Identify and define operating characteristics and applications of single-stage amplifiers.
04.09 Construct single-stage amplifiers.
04.10 Analyze and troubleshoot single-stage amplifiers.
04.11 Construct thyristor circuitry.
04.12 Analyze and troubleshoot thyristor circuitry.
04.13 Set up and operate a VOM for solid-state devices.
04.14 Set up and operate a DVM for solid-state devices.
04.15 Set up and operate power supplies for sold-state devices.
04.16 Set up and operate oscilloscopes for solid-state devices.
04.17 Set up and operate function generators for solid-state devices.
04.18 Set up and operate capacitor/inductor analyzers for solid-state devices.
04.19 Set up and operate curve tracers.
04.20 Set up and operate transistor testers.

05.0 DEMONSTRATE PROFICIENCY IN ANALOG CIRCUITS--The student will be able to:

05.01 Identify and define operational characteristics and applications of multistage amplifiers.
05.02 Construct multistage amplifiers.
05.03 Analyze and troubleshoot multistage amplifiers.
05.04 Identify and define operating characteristics and applications of linear integrated circuits.
05.05 Identify and define operating characteristics and applications of basic power supplies and filters.
05.06 Construct basic power supplies and filters.
05.07 Troubleshoot basic power supplies and filters.
05.08 Identify and define operating characteristics and applications of differential and operational amplifiers.
05.09 Construct differential and operational amplifier circuits.
05.10 Analyze and troubleshoot differential and operational amplifier circuits.
05.11 Identify and define operating characteristics of audio power amplifiers.
05.12 Construct audio power amplifiers.
05.13 Analyze and troubleshoot audio power amplifiers.
05.14 Identify and define operating characteristics and applications of power supply regulator circuits.
05.15 Construct power supply regulator circuits.
05.16 Analyze and troubleshoot power supply regulator circuits.
05.17 Identify and define operating characteristics and applications of active filters.
05.18 Construct active filter circuits.

05.19 Analyze and troubleshoot active filter circuits.
05.20 Identify and define operating characteristics and applications of sinusoidal and nonsinusoidal oscillator circuits.
05.21 Construct oscillator circuits.
05.22 Analyze and troubleshoot oscillator circuits.
05.23 Identify and define operating characteristics and applications of motor phase-shift control circuits (single-phase and multiphase).
05.24 Identify and define operating characteristics and applications of cathode ray tubes.
05.25 Identify and define operating characteristics and applications of optoelectronic devices.
05.26 Set up and operate measuring instruments for analog circuits.

06.0 DEMONSTRATE PROFICIENCY IN DIGITAL CIRCUITS--The student will be able to:

06.01 Define and apply numbering systems to codes and arithmetic operations.
06.02 Analyze/minimize logic circuits using Boolean operations.
06.03 Set up and operate logic probes for digital circuits.
06.04 Set up and operate power supplies for digital circuits and solve power distribution and noise problems.
06.05 Set up and operate pulsers for digital circuits.
06.06 Set up and operate oscilloscopes for digital circuits.
06.07 Set up and operate logic analyzers for digital circuits.
06.08 Set up and operate pulse generators for digital circuits.
06.09 Identify types of logic gates and their truth tables.
06.10 Construct combinational logic circuits using integrated circuits.
06.11 Troubleshoot logic circuits.
06.12 Analyze types of flip-flops and their truth tables.
06.13 Construct flip-flops using integrated circuits.
06.14 Troubleshoot flip-flops.
06.15 Identify, define, and measure characteristics of integrated circuit (IC) logic families.
06.16 Identify types of registers and counters.
06.17 Construct registers and counters using flip-flops and logic gates.
06.18 Troubleshoot registers and counters.
06.19 Analyze clock and timing circuits.
06.20 Construct clock and timing circuits.
06.21 Troubleshoot clock and timing circuits.
06.22 Identify types of arithmetic-logic circuits.
06.23 Construct arithmetic-logic circuits.
06.24 Troubleshoot arithmetic-logic circuits.
06.25 Identify types of encoding and decoding devices.
06.26 Construct encoders and decoders.
06.27 Troubleshoot encoders and decoders.
06.28 Identify types of multiplexer and demultiplexer circuits.
06.29 Construct multiplexer and demultiplexer circuits using integrated circuits.
06.30 Troubleshoot multiplexer and demultiplexer circuits.
06.31 Identify types of memory circuits.

06.32 Relate the uses of digital-to-analog and analog-to-digital conversions.
06.33 Construct digital-to-analog and analog-to-digital circuits.
06.34 Troubleshoot digital-to-analog and analog-to-digital circuits.
06.35 Identify types of digital displays.
06.36 Construct digital display circuits.
06.37 Troubleshoot digital display circuits.

07.0 DEMONSTRATE PROFICIENCY IN MICROPROCESSOR CIRCUITS--The student will be able to:

07.01 Identify CPU (Architecture) building blocks and their uses.
07.02 Analyze BUS concepts.
07.03 Analyze various memory schemes.
07.04 Use memory devices in circuits.
07.05 Troubleshoot memory-device circuits.
07.06 Set up and operate oscilloscopes for microprocessor systems.
07.07 Set up and operate logic/data analyzers for troubleshooting microprocessor systems.
07.08 Identify types of input and output devices and peripherals.
07.09 Interface input and output ports to peripherals.
07.10 Analyze and troubleshoot input and output ports.
07.11 Execute computer instruction sets.

08.0 DEMONSTRATE PROFICIENCY IN TECHNICAL RECORDING AND REPORTING--The student will be able to:

08.01 Draw and interpret electronic schematics.
08.02 Record data and design curves and graphs.
08.03 Write reports and make oral presentations.
08.04 Maintain test logs.
08.05 Make equipment-failure reports.
08.06 Specify and requisition simple electronic components.
08.07 Compose technical letters and memoranda.
08.08 Write formal reports of laboratory experiences.
08.09 Draft preventive maintenance and calibration procedures.

09.0 DEMONSTRATE PROFICIENCY IN HYDRAULIC AND PNEUMATIC TEST INSTRUMENTS--The student will be able to:

09.01 Select and operate basic hydraulic measuring instruments.
09.02 Select and operate dead weight testers.
09.03 Select and operate manometers.
09.04 Select and operate pressure gauges.
09.05 Select and operate basic pneumatic measuring instruments.
09.06 Select and operate pressure calibrators.
09.07 Select and operate vacuum pumps.
09.08 Select and operate dead weight testers.
09.09 Select and operate manometers.
09.10 Select and operate pressure and vacuum gauges.

10.0 DEMONSTRATE PROFICIENCY IN THERMAL TEST INSTRUMENTS--The student will be able to:

10.01 Select and operate basic thermal measuring instruments.
10.02 Select and operate heat baths.
10.03 Select and operate potentiometers.
10.04 Select and operate thermometers.

11.0 DEMONSTRATE PROFICIENCY IN METER TESTING--The student will be able to:

11.01 Determine meter movement, sensitivity and resistance.
11.02 Extend the current of a meter movement.
11.03 Extend the voltage range of a meter movement.
11.04 Perform condition test of semiconductor diodes using an ohmmeter.

12.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

12.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
12.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
12.03 Read and follow written and oral instructions.
12.04 Answer and ask questions coherently and concisely.
12.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
12.06 Demonstrate appropriate telephone/communication skills.

13.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

13.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
13.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
13.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
13.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
13.05 Demonstrate an understanding of federal, state and local taxes and their computation.

14.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

14.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
14.02 Draw conclusions or make inferences from data.
14.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
14.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

15.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

15.01 Conduct a job search.
15.02 Secure information about a job.
15.03 Identify documents which may be required when applying for a job interview.
15.04 Complete a job application form correctly.
15.05 Demonstrate competence in job interview techniques.
15.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
15.07 Identify acceptable work habits.
15.08 Demonstrate knowledge of how to make appropriate job changes.
15.09 Demonstrate acceptable employee health habits.
15.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

16.01 Define entrepreneurship.
16.02 Describe the importance of entrepreneurship to the American economy.
16.03 List the advantages and disadvantages of business ownership.
16.04 Identify the risks involved in ownership of a business.
16.05 Identify the necessary personal characteristics of a successful entrepreneur.
16.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Instrumentation Engineering Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.040401
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT:** The program is designed to prepare individuals for employment as instrumentation engineering technicians, or in related occupations in electronics, or to provide supplemental training to persons currently or previously employed in these occupations.

Electronic Technology and/or Electronic Engineering Technology (CORE) are prerequisites for entry into this electronic specialization program. The CORE program prepares individuals to assemble, install, operate, maintain, troubleshoot and repair electronic equipment used in industry. In addition, it also includes content related to the design, theory, and analysis of electronic systems and applications.

The content includes, but is not limited to, DC circuits, AC circuits, solid-state devices, analog circuits, digital circuits and microprocessor systems. Integrated into this content will be communications skills, leadership skills, human relations skills, employability skills, safe and efficient work practices, use of circuit diagrams and schematics, soldering, laboratory practices and technical recording and reporting.

This specialization content includes but is not limited to calibration of test instruments, thermal, electronic, hydraulic and pneumatic test instruments, design of hydraulic/pneumatic systems, sensors and bench maintenance of communication systems and instruments.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Instrumentation Engineering industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Electronic laboratory activities are an integral part of this program and provide instruction in electricity and electronic theory, practices and equipment, instrumentation, hydraulics, pneumatics, test apparatus and equipment, calibration and troubleshooting technique.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational

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Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

As part of an Associate in Science Degree, there is a major component of general education requirements which allows the student to more easily relate the technical knowledge gained to a theoretical level and to allow for a greater knowledge expansion and transference in the future.

This general education requirement must have a minimum of 15 semester hours with at least one course in oral and written communication and one course in computational skills.

Instruction in microcomputer familiarization is appropriate for inclusion in this program.

Algebra and trigonometry are integral parts of this program.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; and a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in amplitude and frequency modulated transmitters.
02.0 Demonstrate proficiency in AM and FM receivers.
03.0 Demonstrate proficiency in AM and FM transceivers, tools and test equipment and troubleshooting procedures.
04.0 Demonstrate proficiency in electromagnetic wave emissions, wave propagation, antennas and transmission lines.
05.0 Interpret blueprints, schematics and diagrams.
06.0 Demonstrate proficiency in use of Electronic Test Instruments.
07.0 Demonstrate proficiency in use of Hydraulic Test Instruments.
08.0 Demonstrate proficiency in use of Pneumatic Test Instruments.
09.0 Demonstrate proficiency in use of Thermal Test Instruments.
10.0 Demonstrate proficiency in calibration of test instruments.

11.0 Demonstrate understanding of design and analysis of hydraulic and pneumatic systems.

12.0 Demonstrate an understanding of theory and function of sensors including: sensors for radiation detection, sensors for rate measurement, sensors for quantity measurement, sensors for physical property measurement, sensors for chemical property measurement, sensors for measuring electrical properties of materials (i.e., resistance and insulation leakage).

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Instrumentation Engineering Technology
Secondary Number:
Postsecondary Number: 0615.040401

01.0 DEMONSTRATE PROFICIENCY IN AMPLITUDE AND FREQUENCY MODULATED TRANSMITTERS--The student will be able to:

- 01.01 Define DSB, SSB and PM modulation.
- 01.02 Analyze and troubleshoot AM and FM RF oscillator circuits.
- 01.03 Analyze and troubleshoot buffer and multiplier circuits.
- 01.04 Analyze and troubleshoot RF power amplifier circuits.
- 01.05 Analyze and troubleshoot AM and FM modulation circuits.
- 01.06 Analyze and troubleshoot microphone circuits.
- 01.07 Analyze and troubleshoot balanced modulators and SSB filter circuits.
- 01.08 Analyze and troubleshoot AM and FM power supply circuits.
- 01.09 Make power, frequency and modulation measurements of AM and FM transmitters.
- 01.10 Align and troubleshoot AM and FM transmitters.
- 01.11 Describe FCC rules pertaining to AM and FM transmitter maintenance and operation.

02.0 DEMONSTRATE PROFICIENCY IN AM AND FM RECEIVERS--The student will be able to:

- 02.01 Analyze and troubleshoot receiver audio voltage and power amplifiers and speaker/headphone circuits.
- 02.02 Analyze and troubleshoot AM and FM detector circuits.
- 02.03 Analyze and troubleshoot AM IF amplifier circuits.
- 02.04 Analyze and troubleshoot FM IF amplifier and limited circuits.
- 02.05 Analyze and troubleshoot receiver oscillator and AFC circuits.
- 02.06 Analyze and troubleshoot RF mixer hetrodyne circuits.
- 02.07 Analyze and troubleshoot receiver RF amplifier circuits.
- 02.08 Analyze and troubleshoot AVCAGC circuits.
- 02.09 Analyze and troubleshoot receiver power supplies.
- 02.10 Make receiver sensitivity, selectivity, bandwidth, image rejection, and adjacent channel rejection measurements.
- 02.11 Align and troubleshoot AM and FM receivers.

03.0 DEMONSTRATE PROFICIENCY IN AM AND FM TRANSCEIVERS, TOOLS AND TEST EQUIPMENT AND TROUBLESHOOTING PROCEDURES--The student will be able to:

- 03.01 Analyze and troubleshoot transceiver control, metering and switching circuits.
- 03.02 Analyze and troubleshoot transceiver frequency synthesizers and phase locked loop circuits.
- 03.03 Analyze and troubleshoot squelch circuits.
- 03.04 Align and troubleshoot transceivers.

04.0 DEMONSTRATE PROFICIENCY IN ELECTROMAGNETIC WAVE EMISSIONS, WAVE PROPAGATION, ANTENNAS AND TRANSMISSION LINES--The student will be able to:

04.01 Define the radio frequency spectrum.
04.02 Define types of classification of RF emissions.
04.03 Define the characteristics of radio waves.
04.04 Define radio wave propagation method.
04.05 Define the basic types of antennas.
04.06 Analyze the voltage and current relationships and radiation patterns for the basic types of antennas.
04.07 Analyze signal strength problems and measure signal strength.
04.08 Analyze problems pertaining to antenna length, propagation velocity and frequency.
04.09 Analyze methods of antenna tuning, gain and directivity.
04.10 Analyze transmission lines in terms of electrical and physical properties.
04.11 Analyze standing waves, cause and effect and measure standing wave ratios.
04.12 Analyze tuned transmission lines and describe applications.
04.13 Draw voltage, current and impedance relationships for tuned transmission lines.
04.14 Analyze transmission line losses.
04.15 Analyze transmission lines.
04.16 Analyze waveguides, resonant cavities and their application.

05.0 INTERPRET BLUEPRINTS, SCHEMATICS AND DIAGRAMS--The student will be able to:

TO BE ANNOUNCED

06.0 DEMONSTRATE PROFICIENCY IN USE OF ELECTRONIC TEST INSTRUMENTS--The student will be able to:

TO BE ANNOUNCED

07.0 DEMONSTRATE PROFICIENCY IN USE OF HYDRAULIC TEST INSTRUMENTS--The student will be able to:

TO BE ANNOUNCED

08.0 DEMONSTRATE PROFICIENCY USE OF PNEUMATIC TEST INSTRUMENTS--The student will be able to:

TO BE ANNOUNCED

09.0 DEMONSTRATE PROFICIENCY IN USE OF THERMAL TEST INSTRUMENTS--The student will be able to:

TO BE ANNOUNCED

10.0 DEMONSTRATE PROFICIENCY IN CALIBRATION OF TEST INSTRUMENTS--The student will be able to:

TO BE ANNOUNCED

11.0 DEMONSTRATE UNDERSTANDING OF DESIGN AND ANALYSIS OF HYDRAULIC AND PNEUMATIC SYSTEMS--The student will be able to:

TO BE ANNOUNCED

12.0 DEMONSTRATE AN UNDERSTANDING OF THEORY AND FUNCTION OF SENSORS INCLUDING: SENSORS FOR RADIATION DETECTION, SENSORS FOR RATE MEASUREMENT, SENSORS FOR QUANTITY MEASUREMENT, SENSORS FOR PHYSICAL PROPERTY MEASUREMENT, SENSORS FOR CHEMICAL PROPERTY MEASUREMENT, SENSORS FOR MEASURING ELECTRICAL PROPERTIES OF MATERIALS (I.E., RESISTANCE AND INSULATION LEAKAGE)--The student will be able to:

TO BE ANNOUNCED

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Instrumentation Technology
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I150404**
CIP Number	0615.040400
Grade Level	30, 31
Length	600 hours
Certification	TEC ELEC @7 G
	ELECTRONIC @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as instrumentation technicians, instrument mechanics (710.281-026). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content includes, but is not limited to the following: technical training to support professional personnel in the design, development and evaluation of control and measurement devices, maintaining and repairing various types of meters, measuring devices, and control devices; dial pressure gauges; scales and balances; electrical controlling, measuring and recording devices; and optical, aeronautical and navigational instruments.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Instrumentation industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in electricity and electronic theory, practices and equipment, instrumentation, hydraulics, pneumatics, test apparatus and equipment, calibration and troubleshooting techniques.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; and a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

Electronic Technology and/or Electronic Engineering Technology are prerequisites for entry into this electronic specialization. Algebra is recommended as a prerequisite for entry into this program.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 10.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 600 hours in addition to completion of Electronic Technology or Electronic Engineering Technology.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in instrumentation test instruments.
02.0 Demonstrate proficiency in electrical system components.
03.0 Demonstrate proficiency in hydraulic and pneumatic systems.
04.0 Demonstrate proficiency in repairing instrument systems.
05.0 Service thermal measuring instruments.
06.0 Service radiation measuring instruments.
07.0 Service force measuring instruments.
08.0 Service rate measuring instruments.
09.0 Service quantity measuring instruments.
10.0 Troubleshoot and service physical property measuring instruments.
11.0 Service chemical property measuring instruments.
12.0 Troubleshoot and service electrical measuring instruments.
13.0 Calibrate test instruments.
14.0 Demonstrate appropriate communication skills.
15.0 Demonstrate appropriate math skills.
16.0 Demonstrate appropriate understanding of basic science.
17.0 Demonstrate employability skills.

18.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Instrumentation Technology
Secondary Number:
Postsecondary Number: I150404

01.0 DEMONSTRATE PROFICIENCY IN INSTRUMENTATION TEST INSTRUMENTS--The student will be able to:

- 01.01 Operate basic hydraulic measuring instruments.
- 01.02 Operate dead weight testers.
- 01.03 Operate manometers.
- 01.04 Operate basic pneumatic measuring instruments.
- 01.05 Operate vacuum pumps.
- 01.06 Operate pressure and vacuum gauges.
- 01.07 Operate basic thermal measuring instruments.
- 01.08 Operate heat baths.
- 01.09 Operate potentiometers.
- 01.10 Operate thermometers.

02.0 DEMONSTRATE PROFICIENCY IN ELECTRICAL SYSTEM COMPONENTS--The student will be able to:

- 02.01 Identify the basic principles and terminology of process control systems.
- 02.02 Identify components of process control systems.
- 02.03 Create block diagrams of simple and complex loops.
- 02.04 Identify controllers in settings on process control systems.
- 02.05 Identify and explain electrical principles.
- 02.06 Identify and explain electrical motors.
- 02.07 Read and interpret electrical schematic diagrams.
- 02.08 Install electrical system components.
- 02.09 Identify and explain procedures for electronic system maintenance.
- 02.10 Troubleshoot and repair electrical systems using diagnostic techniques.
- 02.11 Perform operating systems checks and make minor adjustments to electrical systems.
- 02.12 Identify electrical system interfaces.

03.0 DEMONSTRATE PROFICIENCY IN HYDRAULIC AND PNEUMATIC SYSTEMS--The student will be able to:

- 03.01 Identify principles and practical applications of hydraulic and pneumatic power.
- 03.02 Identify and define control valves in hydraulic and pneumatic systems.
- 03.03 Identify pressure and safety relief valves and vacuum breakers.
- 03.04 Identify cylinders and motors.
- 03.05 Remove and replace hydraulic and pneumatic components.
- 03.06 Identify strainers and filters in hydraulic and pneumatic systems.

03.07 Identify reservoirs and accumulators in hydraulic and pneumatic systems.
03.08 Identify hydraulic and pneumatic pumps on a system.
03.09 Identify piping, tubing and fittings on a hydraulic and pneumatic system.
03.10 Identify hydraulic fluids.
03.11 Identify system interfaces.
03.12 Identify practical applications and principles of pneumatic and hydraulic power.
03.14 Identify primary and secondary treatment methods in systems.
03.15 Identify the procedures for pneumatic and hydraulic system maintenance.
03.16 Perform operating systems checks to pneumatic and hydraulic systems.
03.17 Locate control valve failures.
03.18 Identify safety isolation procedures for removing a device from a system.

04.0 DEMONSTRATE PROFICIENCY IN REPAIRING INSTRUMENT SYSTEMS--The student will be able to:

04.01 Identify automatic control systems functions.
04.02 Identify the elements of process control.
04.03 Identify system transmitters and receivers.
04.04 Identify diagrams symbols and networks.
04.05 Identify parameters of an operational process control system.
04.06 Identify measurement purpose and requirements.
04.07 Identify the elements of measurement systems.
04.08 Identify transducers.
04.09 Identify instrument calibration standard units.
04.10 Analyze systems using troubleshooting flow sheet.
04.11 Identify pressure principles.
04.12 Identify pressure sensors.
04.13 Identify pressure transducers.
04.14 Identify low pressure measurement gauge requirements.
04.15 Install, maintain and service pressure instruments.
04.16 Identify force, stress and strain measurement units.
04.17 Identify weight and mass measuring instruments.
04.18 Identify methods for weighing materials in motion.
04.19 Identify displacement measurement methods.
04.20 Identify acceleration, vibration and shock measurement methods.
04.21 Identify the properties of fluid flow measurement.
04.22 Identify primary measuring devices for fluid flow.
04.23 Identify secondary measuring devices for fluid flow.
04.24 Identify applications for variable area instruments.
04.25 Identify open channel flow devices.
04.26 Identify applications for positive displacement meters.
04.27 Identify applications for turbine flow meters.
04.28 Identify applications for magnetic flow meters.
04.29 Identify applications for ultrasonic flow metering methods.
04.30 Identify solid particle flow metering methods.
04.31 Install, maintain and service flow instruments.
04.32 Identify level measurement instruments.
04.33 Identify pressure head instruments.

04.34 Identify electrical methods for level measurement.
04.35 Identify solid particle level measuring systems.
04.36 Maintain and service level measuring instruments.
04.37 Identify and explain temperature measuring principles and sensors.
04.38 Identify final control elements in process loops.
04.39 Identify electric actuators.
04.40 Identify pneumatic and hydraulic actuators.
04.41 Identify control valves.
04.42 Identify control element applications.
04.43 Identify on-site safety standards and maintenance practices.
04.44 Detail electrical and electronic servicing stations.
04.45 Detail pneumatic and hydraulic servicing stations.
04.46 Detail troubleshooting requirements.
04.47 Identify applications of vacuum measuring methods.

05.0 SERVICE THERMAL MEASURING INSTRUMENTS--The student will be able to:

05.01 Determine temperature measuring instrument and sensor failures.
05.02 Troubleshoot temperature measuring instruments and sensors.
05.03 Remove and replace temperature measuring instrument and sensor components.
05.04 Perform operating systems checks and make adjustments to temperature measuring instruments and sensors.
05.05 Determine calorific value measuring instrument failures.
05.06 Troubleshoot calorific value measuring instrument.
05.07 Remove and replace calorific value measuring instrument components.
05.08 Perform operating systems checks and make minor adjustments to calorific value measuring instruments.
05.09 Identify and explain bimetallic and fluid-filled temperature measuring instruments.
05.10 Identify instruments using electrical methods of measuring temperature.
05.11 Identify pyrometers.
05.12 Install, maintain and service temperature measuring instruments.

06.0 SERVICE RADIATION MEASURING INSTRUMENTS--The student will be able to:

06.01 Troubleshoot and repair radiation measuring instruments.
06.02 Perform operating systems checks and make minor adjustments to radiation measuring instruments.
06.03 Troubleshoot and repair photometric measuring instruments.
06.04 Perform operating systems checks and make minor adjustments to photometric measuring instruments.
06.05 Troubleshoot and repair acoustic measuring instruments.
06.06 Perform operating systems checks and make minor adjustments to acoustic measuring instruments.

07.0 SERVICE FORCE MEASURING INSTRUMENTS--The student will be able to:

07.01 Troubleshoot and repair moment (torque) measuring instruments.

07.02 Perform operating systems checks and make adjustments to moment (torque) measuring instruments.
07.03 Troubleshoot and repair force per unit area measuring instruments.
07.04 Perform operating systems checks and make adjustments to force per unit area measuring instruments.

08.0 SERVICE RATE MEASURING INSTRUMENTS--The student will be able to:

08.01 Troubleshoot and repair flow measuring instrument failures.
08.02 Perform operating system checks and make minor adjustments to flow measuring instruments.
08.03 Troubleshoot and repair velocity measuring instruments.
08.04 Perform operating systems checks and make minor adjustments to velocity measuring instruments.
08.05 Troubleshoot and repair acceleration measuring instruments.
08.06 Perform operating systems checks and make minor adjustments to weight measuring instruments.

09.0 SERVICE QUANTITY MEASURING INSTRUMENTS--The student will be able to:

09.01 Troubleshoot and repair mass measuring instrument failures.
09.02 Perform operating systems checks and make minor adjustments to mass measuring instruments.
09.03 Troubleshoot and repair weight measuring instruments.
09.04 Perform operating systems checks and make minor adjustments to weight measuring instruments.
09.05 Identify characteristics of strain gauge measurement components and techniques.
09.06 Install, maintain and service strain gauge instruments.

10.0 TROUBLESHOOT AND SERVICE PHYSICAL PROPERTY MEASURING INSTRUMENTS--The student will be able to:

10.01 Troubleshoot and repair density and specific gravity measuring instruments.
10.02 Perform operating systems checks and make adjustments to density and specific gravity measuring instruments.
10.03 Troubleshoot and repair humidity measuring instruments.
10.04 Perform operating systems checks and make adjustments to humidity measuring instruments.
10.05 Troubleshoot and repair moisture content measuring instruments.
10.06 Perform operating systems checks and make minor adjustments to moisture content measuring instruments.
10.07 Troubleshoot and repair viscosity measuring instruments.
10.08 Perform operating systems checks and make minor adjustments to viscosity measuring instruments.
10.09 Troubleshoot and repair consistency measuring instruments.
10.10 Perform operating systems check and make minor adjustments to consistency measuring instruments.

11.0 SERVICE CHEMICAL PROPERTY MEASURING INSTRUMENTS--The student will be able to:

11.01 Troubleshoot and repair analytical measuring instruments.
11.02 Perform operating systems checks and make minor adjustments to analytical measuring instruments.
11.03 Troubleshoot and repair Ph measuring instruments.
11.04 Perform operating systems checks and make minor adjustments to Ph measuring instruments.
11.05 Troubleshoot and repair liquid conductivity measuring instruments.
11.06 Perform operating systems checks and make adjustments to liquid conductivity measuring instruments.
11.07 Troubleshoot and repair chromatograph measuring instruments.
11.08 Perform operating systems checks and make minor adjustments to chromatograph measuring instruments.
11.09 Troubleshoot and repair mass spectrometer measuring instruments.
11.10 Perform operating systems checks and make adjustments to mass spectrometer measuring instruments.
11.11 Troubleshoot and repair gas analyzer measuring instruments.
11.12 Perform operating systems checks and make minor adjustments to gas analyzer measuring instruments.

12.0 TROUBLESHOOT AND SERVICE ELECTRICAL MEASURING INSTRUMENTS--The student will be able to:

12.01 Troubleshoot and repair electromotive force measuring instruments.
12.02 Perform operating systems checks and make adjustments to electromotive force measuring instruments.
12.03 Troubleshoot and repair electric current measuring instruments.
12.04 Perform operating systems checks and make adjustments to electric current measuring instruments.
12.05 Troubleshoot and repair resistance measuring instruments.
12.06 Perform operating systems checks and make minor adjustments to resistance measuring instruments.
12.07 Troubleshoot and repair conductance measuring instruments.
12.08 Perform operating systems checks and make minor adjustments to conductance measuring instruments.
12.09 Troubleshoot and repair inductance measuring instruments.
12.10 Perform operating systems checks and make minor adjustments to inductance measuring instruments.
12.11 Troubleshoot and repair capacitance measuring instruments.
12.12 Perform operating systems checks and make minor adjustments to capacitive measure instruments.
12.13 Troubleshoot and repair impedance measuring instruments.
12.14 Perform operating systems checks and make minor adjustments to impedance measuring instruments.

13.0 CALIBRATE TEST INSTRUMENTS--The student will be able to:

13.01 Calibrate volt-OHM millimeters (VOM).
13.02 Calibrate electronic voltmeters (EVM).
13.03 Calibrate transistor testers.
13.04 Calibrate resistor substitution boxes.
13.05 Calibrate oscilloscopes.

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13.06 Calibrate function generators.
13.07 Calibrate frequency meters.
13.08 Calibrate power supply voltage.

14.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

14.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
14.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
14.03 Read and follow written and oral instructions.
14.04 Answer and ask questions coherently and concisely.
14.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
14.06 Demonstrate appropriate telephone/communication skills.

15.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

15.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
15.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
15.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
15.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
15.05 Demonstrate an understanding of federal, state and local taxes and their computation.

16.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

16.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
16.02 Draw conclusions or make inferences from data.
16.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
16.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

17.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

17.01 Conduct a job search.
17.02 Secure information about a job.
17.03 Identify documents which may be required when applying for a job interview.
17.04 Complete a job application form correctly.
17.05 Demonstrate competence in job interview techniques.
17.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
17.07 Identify acceptable work habits.

17.08 Demonstrate knowledge of how to make appropriate job changes.
17.09 Demonstrate acceptable employee health habits.
17.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

18.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

18.01 Identify characteristics of the American enterprise system.
18.02 Define inflation and deflation.
18.03 Illustrate the basic economic questions facing any society.
18.04 Determine the results of a change in demand or a change in supply.
18.05 List factors which contribute to economic growth.
18.06 Identify characteristics of different types of business ownership.
18.07 Choose appropriate action in a situation requiring application of business ethics.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Land Surveying
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.020301
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as a surveying manager, or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, recordkeeping skills and mathematics, and use of surveying equipment to perform measurement activities.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Land Surveying industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in chaining, rod and level activities, angle measurement, electronic distance measurement, land surveying and construction layout.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum

content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The specialized content includes but is not limited to surveying techniques, sketching and drawing, engineering measurement, and drafting skills.

As part of an Associate in Science Degree, there is a major component of general education requirements which allows the student to more easily relate the technical knowledge gained to a theoretical level and to allow for a greater knowledge expansion and transference in the future.

This general education requirement must have a minimum of 15 semester hours with at least one course in oral and written communication and one course in computational skills.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Measure land using chains and tape.
02.0 Perform rod and level activities.
03.0 Perform angle measurement activities.
04.0 Perform electronic distance measurement activities.
05.0 Perform land surveying activities.
06.0 Perform construction stake out activities.
07.0 Perform supervisory functions.
08.0 Determine methods and procedures for establishing survey control.
09.0 Develop sketches and drawings.
10.0 Research previous survey evidence.
11.0 Compute volumes and areas.
12.0 Read, interpret, and write descriptions of land.
13.0 Prepare charts and tables.
14.0 Demonstrate appropriate communication skills.
15.0 Demonstrate appropriate math skills.
16.0 Demonstrate appropriate understanding of basic science.
17.0 Demonstrate employability skills.
18.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Land Surveying
Secondary Number:
Postsecondary Number: 0615.020301

01.0 MEASURE LAND USING CHAINS AND TAPE--The student will be able to:

- 01.01 Clear brush to establish line of sight.
- 01.02 Hold the chain/tape over a point.
- 01.03 Pull the chain/tape.
- 01.04 Wind the chain/tape on reel.
- 01.05 Set the marker.
- 01.06 Loop and throw the unreeled chain/tape.
- 01.07 Establish a line perpendicular to an existing line at a given point using a right angle prism.
- 01.08 Establish elevation using a hand (Locke) level.
- 01.09 Test and standardize the chain/tape.

02.0 PERFORM ROD AND LEVEL ACTIVITIES--The student will be able to:

- 02.01 Plumb the rod.
- 02.02 Obtain a rod reading using a target.
- 02.03 Obtain a rod reading with using a target.
- 02.04 Establish a turning point benchmark.
- 02.05 Set up the level.
- 02.06 Test the level.

03.0 PERFORM ANGLE MEASUREMENT ACTIVITIES--The student will be able to:

- 03.01 Set up a transit theodolite over a point.
- 03.02 Measure a horizontal angle.
- 03.03 Measure a vertical angle.
- 03.04 Lay out a horizontal angle.
- 03.05 Lay out a vertical angle.
- 03.06 Read a compass bearing.
- 03.07 Adjust transit theodolite leveling bubbles.
- 03.08 Adjust transit theodolite vertical cross-hair by double centering.
- 03.09 Adjust transit theodolite vertical cross-hair for vertical accuracy.

04.0 PERFORM ELECTRONIC DISTANCE MEASUREMENT ACTIVITIES--The student will be able to:

- 04.01 Test accuracy of instrument against a known point.
- 04.02 Set up EDM.
- 04.03 Obtain scope distance and compute horizontal distance.
- 04.04 Set up reflector.

05.0 PERFORM LAND SURVEYING ACTIVITIES--The student will be able to:

05.01 Determine horizontal distance by the stadia method.
05.02 Determine elevation by the stadia method.
05.03 Locate detail by angle and distance using a transit theodolite.
05.04 Locate detail by the use of a plane table and a lidade.
05.05 Establish property corners from deed descriptions or plat.
05.06 Secure a deed from the courthouse.

06.0 PERFORM CONSTRUCTION STAKE OUT ACTIVITIES--The student will be able to:

06.01 Establish horizontal control.
06.02 Establish vertical control.
06.03 Stake out horizontal curves.
06.04 Determine elevations for vertical curves.
06.05 Establish slope stakes.

07.0 PERFORM SUPERVISORY FUNCTIONS--The student will be able to:

07.01 Demonstrate equipment use.
07.02 Inventory field supplies and equipment.
07.03 Select equipment.
07.04 Evaluate personnel
07.05 Schedule work.
07.06 Perform mathematical checks on field work.
07.07 Keep field notes.

08.0 DETERMINE METHODS AND PROCEDURES FOR ESTABLISHING SURVEY CONTROL--The student will be able to:

08.01 Understand and apply methods of distance measurements.
08.02 Understand and apply methods of angle measurements.
08.03 Understand and apply azimuth determination.
08.04 Understand and apply closure computations.
08.05 Understand and apply adjustment of data.

09.0 DEVELOP SKETCHES AND DRAWINGS--The student will be able to:

09.01 Make lettering sketches to identify items.
09.02 Demonstrate inking procedures.
09.03 Identify map symbolism.
09.04 Define and interpret dimensioning.
09.05 Write a brief but adequate property description.

10.0 RESEARCH PREVIOUS SURVEY EVIDENCE--The student will be able to:

10.01 Be familiar with courthouse procedures.
10.02 Conduct a title search.
10.03 Demonstrate an understanding of deeds.
10.04 Search for record evidence.
10.05 Demonstrate proper resurvey processes.

11.0 COMPUTE VOLUMES AND AREAS--The student will be able to:

11.01 Compute an area by using trapezoids
11.02 Compute an area by using coordinates.

11.03 Compute an area of a curved surface.
11.04 Compute volumes of linear dimension surfaces.
11.05 Compute volumes of curved surfaces.

12.0 READ, INTERPRET, AND WRITE DESCRIPTIONS OF LAND--The student will be able to:

12.01 Prepare metes-and-bounds descriptions.
12.02 Understand the U.S. Public Land Survey System.
12.03 Understand and interpret sectionalized surveys.
12.04 Understand and interpret sectional breakdowns.
12.05 Understand and interpret standard deed information.

13.0 PREPARE CHARTS AND TABLES--The student will be able to:

13.01 Understand and prepare curve information.
13.02 Understand and prepare highway design information.
13.03 Understand and prepare standard control information.
13.04 Understand and prepare proper field notes.
13.05 Understand and prepare proper legend information.

14.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

14.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
14.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
14.03 Read and follow written and oral instructions.
14.04 Answer and ask questions coherently and concisely.
14.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
14.06 Demonstrate appropriate telephone/communication skills.

15.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

15.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
15.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
15.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
15.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
15.05 Demonstrate an understanding of federal, state and local taxes and their computation.

16.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

16.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
16.02 Draw conclusions or make inferences from data.

16.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

16.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

17.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

17.01 Conduct a job search.

17.02 Secure information about a job.

17.03 Identify documents which may be required when applying for a job interview.

17.04 Complete a job application form correctly.

17.05 Demonstrate competence in job interview techniques.

17.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

17.07 Identify acceptable work habits.

17.08 Demonstrate knowledge of how to make appropriate job changes.

17.09 Demonstrate acceptable employee health habits.

17.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

18.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

18.01 Define entrepreneurship.

18.02 Describe the importance of entrepreneurship to the American economy.

18.03 List the advantages and disadvantages of business ownership.

18.04 Identify the risks involved in ownership of a business.

18.05 Identify the necessary personal characteristics of a successful entrepreneur.

18.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Laser Electro-Optic Engineering Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.030401
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT:** This program is designed to prepare students for employment as laser engineering technicians or in related occupations in electronics, or to provide supplemental training for persons previously or currently employed in these occupations.

Electronic Technology and/or Electronic Engineering Technology (CORE) are prerequisites for entry into this electronic specialization program. The CORE program prepares individuals to assemble, install, operate, maintain, troubleshoot and repair electronic equipment used in industry. In addition, it also includes content related to the design, theory, and analysis of electronic systems and applications.

This specialization content includes, but is not limited to, assembly, installation, operation, maintenance, troubleshooting and repairing of laser electro-optic equipment. This program contains content related to the design, theory, and analysis of laser systems and applications. The specialized content also includes optical systems and elements, laser applications, laser energy, laser optical measurements, assembly of laser components, gas lasers, and solid state lasers.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Laser Electro-Optic Engineering industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Electronic laboratory activities are an integral part of this program. The tools, test equipment, materials and processes used in this laboratory are similar to those used in industry. Students should be able to use the various types of precision test equipment found in general use throughout the electronics industry for the purpose of analyzing, troubleshooting and repairing electronic circuitry.

III. **SPECIAL NOTE:** As part of an Associate in Science Degree, there is a major component of general education requirements which allows the student to more easily relate the technical knowledge gained to a theoretical level and to allow for greater knowledge expansion and transference in the future.

This general education requirement must have a minimum of 15 semester hours with at least one course in oral and written communication and one course in computational skills. The computational skills should include algebra and trigonometry.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; and a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

When content from the Florida common core electronics program (Electronics Technology) is included, the typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency, identification and use of lasers.
02.0 Demonstrate and practice the use of optical elements.
03.0 Demonstrate and analyze wave optical systems.
04.0 Perform laser technology applications.
05.0 Calibrate, troubleshoot, and analyze laser peripheral components.
06.0 Demonstrate and practice laser energy applications.
07.0 Analyze, construct and demonstrate laser optical measurements.
08.0 Demonstrate proficiency in analysis and evaluation of wave optical systems.
09.0 Demonstrate proficiency in analysis, assembly of laser components, and test beam characteristics.
10.0 Demonstrate proficiency in optical systems, making use of wave characteristics of light.
11.0 Demonstrate proficiency in operating output beam characteristics of various gas lasers.
12.0 Demonstrate proficiency in solid-state lasers in various operational modes.

13.0 Demonstrate proficiency in laser systems designs appropriate to assigned applications.

14.0 Demonstrate proficiency planning and documenting a laser-oriented project.

15.0 Demonstrate appropriate communication skills.

16.0 Demonstrate appropriate math skills.

17.0 Demonstrate appropriate understanding of basic science.

18.0 Demonstrate employability skills.

19.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Laser Electro-Optic Engineering Technology
Secondary Number:
Postsecondary Number: 0615.030401

01.0 DEMONSTRATE PROFICIENCY, IDENTIFICATION AND USE OF LASERS--The student will be able to:

- 01.01 Identify and apply laser safety practices.
- 01.02 Define and identify the elements and operation of a laser.
- 01.03 Operate a power meter.
- 01.04 Demonstrate proper cleaning techniques for optical material.
- 01.05 Identify and utilize component supports.
- 01.06 Analyze the use of filters and beam-splitters.
- 01.07 Define and analyze the properties of light.
- 01.08 Measure and analyze the emission and absorption of light.
- 01.09 Define and analyze lasing action.
- 01.10 Identify, analyze and define optical cavities and modes of oscillation.

02.0 DEMONSTRATE AND PRACTICE THE USE OF OPTICAL ELEMENTS--The student will be able to:

- 02.01 Describe and analyze temporal characteristics.
- 02.02 Describe and analyze spatial characteristics.
- 02.03 Define and analyze the characteristics of a gas laser.
- 02.04 Define laser classifications and characteristics.
- 02.05 Define reflection and refraction.
- 02.06 Apply principles of reflection graphically and experimentally.
- 02.07 Apply principles of refraction graphically and experimentally.
- 02.08 Apply principles of imaging with a single lens graphically and experimentally.
- 02.09 Apply principles of imaging with a multiple lens graphically and experimentally.
- 02.10 Apply principles of the effect of F-stop and apertures graphically and experimentally.

03.0 DEMONSTRATE AND ANALYZE WAVE OPTICAL SYSTEMS--The student will be able to:

- 03.01 Identify and analyze light sources and their characteristics.
- 03.02 Define and describe the quantities of radiometric and photometric in the radiation of energy/power.
- 03.03 Describe and define the wave nature of light.
- 03.04 Analyze reflection and refraction using the principles of the wave nature of light.
- 03.05 Identify and apply the effects of propagation of light.
- 03.06 Demonstrate the interference light.
- 03.07 Define and apply the principles of the diffraction of light.
- 03.08 Demonstrate the polarization of light.
- 03.09 Operate polarizers.

03.10 Define and analyze the coupling of light into fiber optics.
03.11 Analyze the propagation of light in fiber optics.
03.12 Describe the construction of optical fibers.
03.13 Identify and describe the losses in fiber optics.
03.14 Identify the advantages and disadvantages of fiber optics.

04.0 PERFORM LASER TECHNOLOGY APPLICATIONS--The student will be able to:

04.01 Define and apply nondestructive testing techniques.
04.02 Define and apply range finding.
04.03 Define and apply alignment and angle testing.
04.04 Construct four types of interferometers.
04.05 Construct and use a holography system.

05.0 CALIBRATE, TROUBLESHOOT, AND ANALYZE LASER PERIPHERAL COMPONENTS--The student will be able to:

05.01 List the properties of different types of optical materials.
05.02 Define and demonstrate the limitations of optical materials.
05.03 Define and demonstrate windows and flats.
05.04 Define and demonstrate mirrors and etalons.
05.05 Apply and analyze prisms.
05.06 Apply and analyze the use of lenses.
05.07 Apply and analyze the use of gratings.
05.08 Apply and define nonlinear materials.
05.09 Apply beam expanders and spatial filters.

06.0 DEMONSTRATE AND PRACTICE LASER ENERGY APPLICATIONS--The student will be able to:

06.01 Apply and define laser safety, hazards and evaluation.
06.02 Troubleshoot and analyze pulsed laser flashlamps and power supplies.
06.03 Troubleshoot and use power sources for CW lasers.
06.04 Define and analyze the use of CW solid lasers-efficiency and cooling.
06.05 Measure and record laser power and energy.
06.06 Apply laser beam divergence and focusing.
06.07 Troubleshoot and define optically pumped pulsed solid lasers.
06.08 Troubleshoot and define laser Q-switching.
06.09 Apply and define semiconductor lasers.

07.0 ANALYZE, CONSTRUCT AND DEMONSTRATE LASER OPTICAL MEASUREMENTS--The student will be able to:

07.01 Operate and analyze electro-optic devices.
07.02 Operate and analyze acousto-optic devices.
07.03 Define mode-locking.

08.0 DEMONSTRATE PROFICIENCY IN ANALYSIS AND EVALUATION OF WAVE OPTICAL SYSTEMS--The student will be able to:

08.01 Measure the imaging properties of single lenses.
08.02 Measure the magnification of multiple lens systems.

08.03 Adjust the telescope for collimation.
08.04 Measure and correct lens system for minimum aberration.
08.05 Measure the effect of F-stops and apertures.
08.06 Measure the properties of gratings.
08.07 Describe the fundamental characteristics of image erection systems.
08.08 Apply the matrix method of ray tracing through optical systems.
08.09 Analyze the effective use of filters and beam splitters.
08.10 Test the stability of optical mounting methods.
08.11 Measure light intensity in photometric units.

09.0 DEMONSTRATE PROFICIENCY IN ANALYSIS, ASSEMBLY OF LASER COMPONENTS, AND TEST BEAM CHARACTERISTICS--The student will be able to:

09.01 Identify and analyze light sources and their characteristics.
09.02 Define and describe the quantities of radiometric and photometric in the radiation of energy/power.
09.03 Describe and define the wave nature of light.
09.04 Demonstrate the effects of reflection and refraction.
09.05 Demonstrate the effects of propagation of light.
09.06 Demonstrate the interference light.
09.07 Demonstrate the diffraction of light.
09.08 Distinguish between specular, diffuse and fresnel reflections.
09.09 Demonstrate the use of polarizers.
09.10 Measure filter absorption and optical density.
09.11 Observe and calculate (using several light sources) the wave length and frequency of prominent spectral lines.
09.12 Assemble and align a HeNe laser resonator.
09.13 Measure beam diameter and divergence.
09.14 Set up and operate a spectrometer.
09.15 Demonstrate proper cleaning of an uncoated optical surface.
09.16 Measure and diagram reflection characteristics of plan surfaces.
09.17 Measure transmission and absorption of optical materials (propagation).
09.18 Analyze photodectors.
09.19 Troubleshoot photodectors.
09.20 Calibrate photodectors.

10.0 DEMONSTRATE PROFICIENCY IN OPTICAL SYSTEMS, MAKING USE OF WAVE CHARACTERISTICS OF LIGHT--The student will be able to:

10.01 Measure and diagram reflection characteristics of spherical surfaces.
10.02 Measure and diagram refraction characteristics of plan surfaces.
10.03 Measure and diagram refraction characteristics of spherical surfaces.
10.04 Demonstrate diffraction and interference.
10.05 Demonstrate polarization characteristics of light.
10.06 Demonstrate the optical characteristics of prisms.
10.07 Demonstrate the optical characteristics of windows.
10.08 Demonstrate the fundamental characteristics of wedges.
10.09 Measure the local length of spherical single lenses.

10.10 Demonstrate the optical path differences in thin films.
10.11 Design and construct a laser-up collimator.
10.12 Measure the wave length of basic lasers.
10.13 Measure the temporal output of basic lasers.
10.14 Measure the spatial output of basic lasers.
10.15 Make a qualitative interpretation and assessment of the surface quality of a test optical surface, based on the interference patterns produced from the surfaces of an optical flat, wedged and curved spherical.
10.16 Set up and operate a monochromator.
10.17 Set up and operate a Michelson interferometer.
10.18 Set up and operate a Fabry-Perot interferometer.
10.19 Set up and operate a Twyman-Green interferometer.
10.20 Measure the longitudinal mode spacing of a TEMO laser, utilizing optical spectrum analyzer.

11.0 DEMONSTRATE PROFICIENCY IN OPERATING OUTPUT BEAM CHARACTERISTICS OF VARIOUS GAS LASERS--The student will be able to:

11.01 Analyze power sources for CW lasers (gas and solid state).
11.02 Troubleshoot power sources for CW lasers (gas and solid state).
11.03 Analyze pulsed laser power supplies.
11.04 Troubleshoot pulsed laser power supplies.
11.05 Analyze energy transfer in laser systems (automatic, ionic and molecular).
11.06 Calculate energy transfer in laser systems (atomic, ionic and molecular).
11.07 Analyze CW lasers.
11.08 Troubleshoot CW lasers.
11.09 Analyze pulsed lasers.
11.10 Troubleshoot pulsed lasers.
11.11 Demonstrate the effects of Q-switching.
11.12 Demonstrate the use of autocollimators.
11.13 Demonstrate Q-switching methods (dye, EO, AO and mechanical).
11.14 Demonstrate use of modulators and deflators.
11.15 Calculate/measure percentage of transmission of CW CO2 laser beam through uncoated GE lens.
11.16 Combine helium, nitrogen and carbon dioxide in CO2 laser and determine power output for various mixture ratios.

12.0 DEMONSTRATE PROFICIENCY IN SOLID-STATE LASERS IN VARIOUS OPERATIONAL MODES--The student will be able to:

12.01 Analyze and troubleshoot flashlamp ignition and simmer circuits.
12.02 Determine beam convergence as function of lamp current to produce graph of lamp current vs. Nd:YAG laser.
12.03 Demonstrate Q-switching methods.
12.04 Demonstrate frequency doubling in Nd:YAG laser.
12.05 Measure output beam characteristics of a pulsed Nd:YAG laser.
12.06 Design and construct a breadboard pulse-forming network containing a gas-filled flashlamp.

13.0 DEMONSTRATE PROFICIENCY IN LASER SYSTEMS DESIGNS APPROPRIATE TO ASSIGNED APPLICATIONS--The student will be able to:

13.01 Choose the best laser to use for a given material processing application.
13.02 List the variables that determine the speed and quality of material procession applications.
13.03 Measure and adjust the output characteristics of laser beams.
13.04 Describe the alignment procedure of an articulated arm beam delivery system.
13.05 Draw a schematic illustration of the optical system of a micromanipulator used to position a CO2 laser beam on a medical target.
13.06 Demonstrate the effect on a tissue target of varying the focal length of an objective lens.
13.07 Determine atmospheric attenuation factors, and the amount of laser power-energy needed to transmit a laser beam over a given range through specified atmospheric conditions.
13.08 List 5 major differences and the same number of similarities of Nd:YAG lasers used for each of the three major applications.
13.09 List 5 major differences and the same number of similarities of CO2 lasers used for each of the three major applications.
13.10 Describe the difference between target designators and rangefinders.

14.0 DEMONSTRATE PROFICIENCY PLANNING AND DOCUMENTING A LASER-ORIENTED PROJECT--The student will be able to:

14.01 Demonstrate medical laser safety.
14.02 Demonstrate ANSI laser safety standards.
14.03 Demonstrate CDRH laser safety standards.
14.04 Perform safety assessment of a facility which uses laser devices.

15.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

15.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
15.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
15.03 Read and follow written and oral instructions.
15.04 Answer and ask questions coherently and concisely.
15.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
15.06 Demonstrate appropriate telephone/communication skills.

16.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

16.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
16.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

16.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
16.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
16.05 Demonstrate an understanding of federal, state and local taxes and their computation.

17.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

17.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
17.02 Draw conclusions or make inferences from data.
17.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
17.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct a job search.
18.02 Secure information about a job.
18.03 Identify documents which may be required when applying for a job interview.
18.04 Complete a job application form correctly.
18.05 Demonstrate competence in job interview techniques.
18.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
18.07 Identify acceptable work habits.
18.08 Demonstrate knowledge of how to make appropriate job changes.
18.09 Demonstrate acceptable employee health habits.
18.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

19.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

19.01 Identify characteristics of the American enterprise system.
19.02 Define inflation and deflation.
19.03 Illustrate the basic economic questions facing any society.
19.04 Determine the results of a change in demand or a change in supply.
19.05 List factors which contribute to economic growth.
19.06 Identify characteristics of different types of business ownership.
19.07 Choose appropriate action in a situation requiring application of business ethics.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Laser Electro-Optic Technology
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I150304**
CIP Number	0615.030400
Grade Level	30, 31
Length	1800 to 2000 hours
Certification	TEC ELEC @7 G
	ELECTRONIC @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as electrical and electronics technicians (22505231), laser electro-optic technicians (019.181-010). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content includes, but is not limited to the following: identification, use and maintenance of lasers and laser systems; use of optical elements; performance of laser technology applications; calibration, troubleshooting and analyzing laser peripheral components; and demonstration of laser energy applications.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Laser Electro-Optic industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students will receive instruction in laser safety, optical cleaning, use of applicable laser test equipment, optical systems, laser technology, laser peripheral components, laser applications, laser projects and laser optics measurements.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; and a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

Electronic Technology and/or Electronic Engineering Technology are prerequisites for entry into this electronic specialization. Algebra is recommended as a prerequisite for entry into this program.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 10.0, Language 9.0, Reading 10.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1800-2000 hours when content from the Florida common core electronics program (Electronics Technology) is included.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Identify, use and maintain lasers and laser systems.
02.0 Demonstrate and practice the uses of optical elements.
03.0 Demonstrate and analyze wave optical systems.
04.0 Perform laser technology applications.
05.0 Calibrate, troubleshoot and analyze laser peripheral components.
06.0 Demonstrate and practice laser energy applications.
07.0 Analyze, construct and demonstrate laser optical measurements.
08.0 Demonstrate appropriate communication skills.
09.0 Demonstrate appropriate math skills.
10.0 Demonstrate appropriate understanding of basic science.
11.0 Demonstrate employability skills.
12.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Laser Electro-Optic Technology
Secondary Number:
Postsecondary Number: I150304

01.0 DEMONSTRATE PROFICIENCY, IDENTIFICATION AND USE OF LASERS--The student will be able to:

- 01.01 Identify and apply laser safety practices.
- 01.02 Define and identify the elements and operation of a laser.
- 01.03 Operate a power meter.
- 01.04 Demonstrate proper cleaning techniques for optical material.
- 01.05 Identify and utilize component supports.
- 01.06 Analyze the use of filters and beam-splitters.
- 01.07 Define and analyze the properties of light.
- 01.08 Measure and analyze the emission and absorption of light.
- 01.09 Define and analyze lasing action.
- 01.10 Identify, analyze and define optical cavities and modes of oscillation.

02.0 DEMONSTRATE AND PRACTICE THE USE OF OPTICAL ELEMENTS--The student will be able to:

- 02.01 Describe and analyze temporal characteristics.
- 02.02 Describe and analyze spatial characteristics.
- 02.03 Define and analyze the characteristics of a gas laser.
- 02.04 Define laser classifications and characteristics.
- 02.05 Define reflection and refraction.
- 02.06 Apply principles of reflection graphically and experimentally.
- 02.07 Apply principles of refraction graphically and experimentally.
- 02.08 Apply principles of imaging with a single lens graphically and experimentally.
- 02.09 Apply principles of imaging with a multiple lens graphically and experimentally.
- 02.10 Apply principles of the effect of F-stop and apertures graphically and experimentally.

03.0 DEMONSTRATE AND ANALYZE WAVE OPTICAL SYSTEMS--The student will be able to:

- 03.01 Identify and analyze light sources and their characteristics.
- 03.02 Define and describe the quantities of radiometric and photometric in the radiation of energy/power.
- 03.03 Describe and define the wave nature of light.
- 03.04 Analyze reflection and refraction using the principles of the wave nature of light.
- 03.05 Identify and apply the effects of propagation of light.
- 03.06 Demonstrate the interference light.
- 03.07 Define and apply the principles of the diffraction of light.
- 03.08 Demonstrate the polarization of light.
- 03.09 Operate polarizers.

03.10 Define and analyze the coupling of light into fiber optics.
03.11 Analyze the propagation of light in fiber optics.
03.12 Describe the construction of optical fibers.
03.13 Identify and describe the losses in fiber optics.
03.14 Identify the advantages and disadvantages of fiber optics.

04.0 PERFORM LASER TECHNOLOGY APPLICATIONS--The student will be able to:

04.01 Define and apply nondestructive testing techniques.
04.02 Define and apply range finding.
04.03 Define and apply alignment and angle testing.
04.04 Construct four types of interferometers.
04.05 Construct and use a holography system.

05.0 CALIBRATE, TROUBLESHOOT, AND ANALYZE LASER PERIPHERAL COMPONENTS--The student will be able to:

05.01 List the properties of different types of optical materials.
05.02 Define and demonstrate the limitations of optical materials.
05.03 Define and demonstrate windows and flats.
05.04 Define and demonstrate mirrors and etalons.
05.05 Apply and analyze prisms.
05.06 Apply and analyze the use of lenses.
05.07 Apply and analyze the use of gratings.
05.08 Apply and define nonlinear materials.
05.09 Apply beam expanders and spatial filters.

06.0 DEMONSTRATE AND PRACTICE LASER ENERGY APPLICATIONS--The student will be able to:

06.01 Apply and define laser safety, hazards and evaluation.
06.02 Troubleshoot and analyze pulsed laser flashlamps and power supplies.
06.03 Troubleshoot and use power sources for CW lasers.
06.04 Define and analyze the use of CW solid lasers-efficiency and cooling.
06.05 Measure and record laser power and energy.
06.06 Apply laser beam divergence and focusing.
06.07 Troubleshoot and define optically pumped pulsed solid lasers.
06.08 Troubleshoot and define laser Q-switching.
06.09 Apply and define semiconductor lasers.

07.0 ANALYZE, CONSTRUCT AND DEMONSTRATE LASER OPTICAL MEASUREMENTS--The student will be able to:

07.01 Operate and analyze electro-optic devices.
07.02 Operate and analyze acousto-optic devices.
07.03 Define mode-locking.

08.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

08.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
08.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
08.03 Read and follow written and oral instructions.
08.04 Answer and ask questions coherently and concisely.
08.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
08.06 Demonstrate appropriate telephone/communication skills.

09.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

09.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
09.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
09.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
09.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
09.05 Demonstrate an understanding of federal, state and local taxes and their computation.

10.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

10.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
10.02 Draw conclusions or make inferences from data.
10.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
10.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

11.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

11.01 Conduct a job search.
11.02 Secure information about a job.
11.03 Identify documents which may be required when applying for a job interview.
11.04 Complete a job application form correctly.
11.05 Demonstrate competence in job interview techniques.
11.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
11.07 Identify acceptable work habits.
11.08 Demonstrate knowledge of how to make appropriate job changes.
11.09 Demonstrate acceptable employee health habits.
11.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

12.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

12.01 Identify characteristics of the American enterprise system.
12.02 Define inflation and deflation.
12.03 Illustrate the basic economic questions facing any society.
12.04 Determine the results of a change in demand or a change in supply.
12.05 List factors which contribute to economic growth.
12.06 Identify characteristics of different types of business ownership.
12.07 Choose appropriate action in a situation requiring application of business ethics.

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July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Logistics Systems Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.060301
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for initial employment as logistics technicians, or to provide supplemental training for persons previously or currently employed in these occupations.

This program includes a common core of general education competencies as identified by the industry, which is prerequisite for all Associate in Science Degree programs. This program prepares individuals to enter the Logistics career field as technicians.

The specialization content should include, but not be limited to, logistics systems, technical manuals, support services, management of spares, materials and repair, and logistics design and management.

The general education content includes, but is not limited to, general mathematics, statistics, physics, computer applications, and economics. Integrated into this content will be communication skills, leadership skills, human relation skills, employability skills, safe and efficient work practices, technical recording and reporting.

Elective competencies are chosen from courses in transportation, management, supervision, and computer applications. A minimum of 15 semester hours with at least two components of this core must be of courses designed to develop skills in oral and written communication and in computational skills.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Logistics Systems industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are primarily involved with computer simulation systems and are considered an integral part of this program.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the

vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

As part of an Associate in Science Degree, there is a major component of general education requirements which allow the student to more easily relate the technical knowledge gained to a theoretical level and to allow for a greater knowledge expansion and transference in the future.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is 63-75 semester hours.

Instruction in microcomputer applications and high level languages is appropriate for inclusion in this program. Algebra is a recommended prerequisite for entry into this program.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in the analysis of the concepts and philosophies of integrated logistics support.
02.0 Demonstrate proficiency in the analysis of the responsibilities of a logistician.
03.0 Demonstrate proficiency in the analysis of various types of logistic support systems.
04.0 Demonstrate proficiency in organization and the generation of technical manuals.
05.0 Demonstrate proficiency in the integration of all logistics functions into a total support system.
06.0 Demonstrate proficiency in the organization of training support systems.
07.0 Demonstrate proficiency in the organization of a total repair program for a product being introduced into the marketplace.
08.0 Demonstrate proficiency in the design of a materials management system.
09.0 Demonstrate proficiency in the use of word processing, spreadsheets and data management systems using microcomputers.
10.0 Demonstrate appropriate communication skills.
11.0 Demonstrate appropriate math skills.

12.0 Demonstrate appropriate understanding of basic science.
13.0 Demonstrate employability skills.
14.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Logistics Systems Technology
Secondary Number:
Postsecondary Number: 0615.060301

01.0 DEMONSTRATE PROFICIENCY IN THE ANALYSIS OF THE CONCEPTS AND PHILOSOPHIES OF INTEGRATED LOGISTICS SUPPORT--The student will be able to:

01.01 Describe the principle elements of Integrated Logistics Support.
01.02 Describe the role of the logistician in government contract implementation.
01.03 List the data items included in a major systems contract that are included under the area of responsibility of the logistician.
01.04 Show how the inclusion of integrated logistics support begins with the planning for an item of equipment and continues throughout its useful life.
01.05 Describe the role of reliability engineering in integrated logistics support.
01.06 Explain the relationship of production testing in insuring overall product reliability.
01.07 Describe the concepts of maintainability engineering and how they interrelate to the goals and objectives of the logistician.
01.08 List the components of and show how maintenance planning is a part of the overall implementation of the logistics system.
01.09 Describe the procedures used to identify and obtain the initial stock of spare parts required to support fielded equipment.
01.10 Discuss the organization and acquisition of equipment used to support and test new systems including built-in test equipment.
01.11 Identify the organization of the personnel and technical manual requirements needed to support a new system.
01.12 Describe the components of a proper training system.
01.13 List the four categories of a training system.
01.14 Describe the procedure to develop a training program and identify the training equipment required to support the training program.
01.15 Describe the overall DoD supply system.
01.16 Analyze the requirements for spare parts and inventory management.
01.17 Describe the purpose and requirements of MIL-STD 1367, Packaging, Handling, Storing, and Transportability Program Requirements for Systems and Equipments.
01.18 Analyze the role of the System Safety Engineer in equipment design.
01.19 Describe the application of human engineering as it applies to insuring the safe and efficient operation of equipment and systems.

01.20 Explain why the resource requirements for the support of operation and maintenance of equipment, training, and storage are an important part of overall planning.

01.21 Explain how Repair-Level Analysis is used to evaluate a maintenance action to determine if it is cost effective and where the task can be accomplished most cost effectively.

01.22 Explain how Reliability-Centered Maintenance will develop a scheduled maintenance program which will increase the availability of equipment.

01.23 List the advantages of prediction of the total costs that will be incurred throughout the life of a system.

01.24 Explain the justification for the process known as Logistic Support Analysis.

01.25 List the goals for Logistic Support Analysis.

01.26 Analyze the content of MIL-STD 1388-1A, Logistic Support Analysis.

01.27 Explain how the Integrated Logistics Support Plan is coordinated with and integrated into the overall Logistics support activities.

01.28 Explain how the Integrated Support Plan establishes the policies, procedures, and methods for implementation of a contractor's ILS program.

01.29 Describe the federal government contracting process, different types of contracts, and proposed preparation and pricing.

01.30 Explain how the business activities of a company are separate from the product or service activities.

01.31 List the aspects that must be addressed in order to insure successful program management.

02.0 DEMONSTRATE PROFICIENCY IN THE ANALYSIS OF THE RESPONSIBILITIES OF A LOGISTICIAN--The student will be able to:

02.01 Define spares management.

02.02 Describe the functions and responsibilities of spares management.

02.03 Describe the inter-relationship between spares management and other logistics disciplines.

02.04 Identify and describe the activities involved in spares management.

02.05 Describe and demonstrate how to accomplish budget forecasting.

02.06 Explain the steps required in spares cataloging.

02.07 Describe the operations and functions of inventory management.

02.08 Describe the operations of inventory control.

02.09 Describe various methods of spares management performance evaluations.

02.10 Demonstrate budget forecasting.

02.11 Define "source coding" in relationship to spares selection.

02.12 List the maintenance factors involved in spares management.

02.13 Give an example of "Configuration Control" under documentation/data management.

03.0 DEMONSTRATE PROFICIENCY IN THE ANALYSIS OF VARIOUS TYPES OF LOGISTIC SUPPORT SYSTEMS--The student will be able to:

03.01 Define Logistics design.
03.02 Describe the interrelationship between reliability and maintainability.
03.03 Demonstrate the use of logistics statistical techniques.
03.04 Identify system cost factors.
03.05 Identify logistics cost factors.
03.06 Explain the steps in the development of a maintenance concept.
03.07 Define the four levels of maintenance.
03.08 Explain how to conduct a logistics support analysis.
03.09 Define the test and evaluation categories.
03.10 Explain the relationship between quality control and Configuration Control.
03.11 Explain and/or demonstrate how to determine the MTBF or a sub-system or system.
03.12 Delineate a method for improving the MTBF when given examples of a sub-system or system with a designated MTBF.

04.0 DEMONSTRATE PROFICIENCY IN THE ORGANIZATION AND THE GENERATION OF TECHNICAL MANUALS--The student will be able to:

04.01 Define technical manuals.
04.02 List types of technical manuals and their uses.
04.03 List and describe levels of technical manuals.
04.04 Explain the difference between commercial and military technical manuals.
04.05 Recognize Army, Navy, Air Force and Marine Corps manual numbers.
04.06 Define Data Item Description and DD Form 1423.
04.07 Define technical manual change systems.
04.08 Describe writing level as it pertains to military manuals.
04.09 Describe briefly technical manual distribution systems.
04.10 List several DOD specifications that pertain to technical manuals.
04.11 Explain maintenance concept in terms of a technical manual.
04.12 List various logistics data inputs used for technical manuals.
04.13 Describe functions of logistics data inputs.
04.14 Describe the technical manual research sources.
04.15 List steps in publishing technical manuals.
04.16 Explain personnel requirements for technical manuals.
04.17 Describe costs incurred in the production of technical manuals.

05.0 DEMONSTRATE PROFICIENCY IN THE INTEGRATION 0F ALL LOGISTICS FUNCTIONS INTO A TOTAL SUPPORT SYSTEM--The student will be able to:

05.01 Operate and program the Logistics Management Simulator.
05.02 Describe the basics logistics systems.
05.03 Review simulator tables of information.
05.04 Prepare sample simulator spares input sheets.
05.05 Prepare sample simulator repair input sheets.
05.06 Review simulator output sheets.
05.07 Prepare initial simulator spares and repair input sheets.
05.08 Review initial simulator spares and repair output sheets.
05.09 Prepare first step rate build-up input sheets.
05.10 Review first step rate build-up output sheets.

05.11 Prepare second step rate build-up input sheets.
05.12 Review second step rate build-up output sheets.
05.13 prepare third step rate build-up input sheets.
05.14 Review third step rate build-up output sheets.
05.15 Prepare fourth step rate build-up input sheets.
05.16 Review fourth step rate build-up output sheets.

06.0 DEMONSTRATE PROFICIENCY IN THE ORGANIZATION OF TRAINING SUPPORT SYSTEMS--The student will be able to:

06.01 Define product support services and training.
06.02 Describe the functions and responsibilities of product support services and training representatives.
06.03 Describe the inter-relationship between product support services and training and other logistics disciplines.
06.04 List field service cost factors.
06.05 Explain the steps required in the preparation of product support services and training personnel.
06.06 Identify the various methods of product support services and training reporting.
06.07 Describe the operations and functions of in-house support.
06.08 Explain and give examples of the various methods of product support services and training performance evaluations.
06.09 Define the types of warranty and explain the company's liability with regard to warranties and product performance.
06.10 Demonstrate budget forecasting for a product under study.
06.11 Demonstrate how to fill out a time card.
06.12 List the steps to follow in Emergency Reporting.

07.0 DEMONSTRATE PROFICIENCY IN THE ORGANIZATION OF A TOTAL REPAIR PROGRAM FOR A PRODUCT BEING INTRODUCED INTO THE MARKETPLACE--The student will be able to:

07.01 Describe the how repair is a functional element of the integrated logistics process.
07.02 Describe the impact of maintenance and repair level analysis on the overall repair plan.
07.03 List the elements of a repair shop plan.
07.04 Show how workload forecasting and repair flow is a requirement of the overall repair plan.
07.05 Describe the process of repair cost forecasting.
07.06 Explain the process of warranty management.
07.07 List the key elements of repair planning.
07.08 Describe the elements of configuration control of items in repair.
07.09 Describe the integration of quality control into the process of repair management.
07.10 Discuss the role of engineering support as a component of the repair management process.

08.0 DEMONSTRATE PROFICIENCY IN THE DESIGN OF A MATERIALS MANAGEMENT SYSTEM--The student will be able to:

08.01 Describe the role of materials management in business.

08.02 Discuss the importance of quality assurance and reliability to the overall process of material management.
08.03 Explain the importance of standardization to proper specifications.
08.04 Explain the principles of sources of supply.
08.05 Explain the practices of sources of supply.
08.06 Describe the principles and practices of pricing.
08.07 Describe the standard principles and practices of contract negotiations.
08.08 Explain the principles of inventory management.
08.09 Explain the practices of inventory management.
08.10 Discuss the acquisition of capitol equipment.
08.11 Discuss the problems relating receiving and stores to materials management.
08.12 Describe the planning requirements of materials management.
08.13 List the standard procedures for organizing a materials management program.

09.0 DEMONSTRATE PROFICIENCY IN THE USE OF WORD PROCESSING, SPREADSHEETS AND DATA MANAGEMENT SYSTEMS USING MICROCOMPUTERS--The student will be able to:

09.01 Describe the component parts of a microcomputer system.
09.02 Explain the operation of a basic microcomputer.
09.03 Demonstrate the operation of the Disk Operating System (DOS).
09.04 Demonstrate the use of basic DOS commands.
09.05 Load a word processing applications program (WordPerfect).
09.06 Create a word processor document.
09.07 Demonstrate the use of the special features of the word processor.
09.08 Modify a word processor document.
09.09 Demonstrate the use of formatting functions, file management, and macros.
09.10 Demonstrate the use of advanced WordPerfect functions.
09.11 Build a worksheet document using VP-Planner Plus.
09.12 Format and print a worksheet.
09.13 Use advanced enhancement functions with the worksheet.
09.14 Build worksheets with functions and macros.
09.15 Demonstrate the use of the worksheet graphing functions.
09.16 Sort and query a worksheet database.
09.17 Create and display a database using dBase III Plus.
09.18 Display records in a database.
09.19 Demonstrate sorting and report preparation.
09.20 Demonstrate adding, changing, and deleting records.
09.21 Demonstrate changing the database structure.
09.22 Utilize commercially available software to generate computer graphics.
09.23 Apply data information management concepts in an EDP environment.

10.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

10.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
10.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
10.03 Read and follow written and oral instructions.
10.04 Answer and ask questions coherently and concisely.
10.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
10.06 Demonstrate appropriate telephone/communication skills.

11.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

11.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
11.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
11.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
11.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
11.05 Demonstrate an understanding of federal, state and local taxes and their computation.

12.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

12.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
12.02 Draw conclusions or make inferences from data.
12.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
12.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

13.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

13.01 Conduct a job search.
13.02 Secure information about a job.
13.03 Identify documents that may be required when applying for a job.
13.04 Complete a job application form correctly.
13.05 Demonstrate competence in job interview techniques.
13.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
13.07 Identify acceptable work habits.
13.08 Demonstrate knowledge of how to make job changes appropriately.
13.09 Demonstrate acceptable employee health habits.

14.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

14.01 Define entrepreneurship.

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14.02 Describe the importance of entrepreneurship to the American economy.

14.03 List the advantages and disadvantages of business ownership.

14.04 Identify the risks involved in ownership of a business.

14.05 Identify the necessary personal characteristics of a successful entrepreneur.

14.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CLUSTER CURRICULUM FRAMEWORK

Cluster Title: Machining Technology
Cluster Type: Job Preparatory
Occupational Area: Industrial Education

Components: Two Programs, One Core, Four Occupational Completion Points

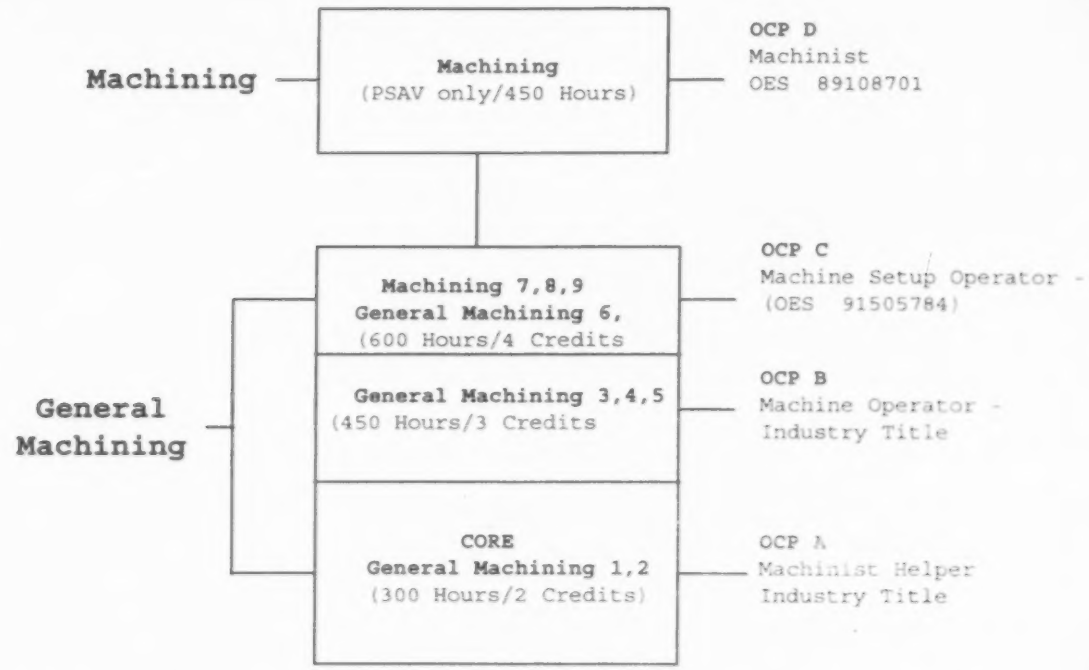
	Secondary	PSAV
Grade Level:	9-12, 30, 31	30, 31
Facility Code:	203	203
VSO:	VICA	VICA
Co-op Method:	Yes	Yes
Apprenticeship:	Yes	Yes

I. **PURPOSE:** The purpose of the programs in this cluster is to prepare students for employment or advanced training in the machining technology industry. This cluster prepares students for entry-level positions as: (1) an assistant machinist (OES 98999009) such as saw operator, crib attendant, drill-press operator, or deburrer; (2) machine operator (Industry Title) to operate equipment after setup, such as a lathe, mill, or grinder; (3) machine setup operator (OES 91505784) to set up and operate a mill, lathe, or grinder; and (4) machinist (OES 89108701) such as a beginning programmer, toolmaker, tool and die maker, or mold maker. This cluster also provides supplemental training for persons previously or currently employed in the machining industry, and prepares students to enter training for the occupations of automotive machinist or gunsmith.

The programs in this cluster focuses on broad, transferable skills, stresses the understanding of all aspects of the machining industry, and demonstrates such elements of the industry as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

II. **CLUSTER STRUCTURE:** This cluster is a planned sequence of instruction consisting of two programs and four occupational completion points. Completion of competencies in the General Machining program is a prerequisite for entrance into the Machining program. The recommended sequence allows students to complete specified portions of the cluster for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training program or terminate as an occupational completer.

The following diagram illustrates the cluster structure:



At the secondary level, the General Machining program consists of the following courses:

MACHINING TECHNOLOGY - 9 secondary credits

CORE
8754010 General Machining 1
8754020 General Machining 2

INTERMEDIATE CORE
8754030 General Machining 3
8754040 General Machining 4
8754050 General Machining 5

ADVANCED CORE
8754060 General Machining 6
8754070 Machining 7
8754080 Machining 8
8754090 Machining 9

III. **LABORATORY ACTIVITIES:** Classroom, shop, and laboratory activities are an integral part of this cluster. These activities include instruction in the use of the safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation.

IV. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., (VICA) is the appropriate vocational student organization (VSO:) for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

Efficient and safe work practices are critical in this cluster. For this reason, it may be useful to refer to the National Occupational Testing Institute for Machine Trades and standards from the National Tooling and Machining Association, 9300 Livingston Road, Ft. Washington, MD 20744. These standards are approved by The Metalworking Industry Skills Standards Board.

The programs in this cluster may be offered in postsecondary adult vocational (PSAV) courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The cooperative method of instruction is appropriate for this program. Whenever the cooperative method is offered, the following is required for each student: a training agreement, a training plan signed by the student, teacher and employer, including instructional objectives and a list of on-the-job and in-school learning experiences and a work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must be paid for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic-skills grade levels required for postsecondary adult vocational students to exit the programs in this cluster are listed before the intended outcomes for each program. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion of the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) or a remedial lab. Please refer to the Rule for exemptions.

When a secondary student with a disability is enrolled in a vocational class for which modifications to the curriculum framework have been made, the particular outcomes and student performance standards that the student must master to earn credit must be specified in the student's individual educational plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

Florida Department of Education
INTENDED OUTCOMES

Program Title:	**General Machining**	
	Secondary	PSAV
Program Number:	**8754000**	**I480502**
CIP Number:	0648050302	0648050302
Grade Level:	9-12, 30, 31	30, 31
Length:	9 Credits	1,350 Hours
Certification:	MACH SHOP @7 G	MACH SHOP @7 G
	METAL WORK @7 G	METAL WORK @7 G
	TOOL DIE @7 G	TOOL DIE @7 G

Basic-Skills Grade Level:

Math	8
Language	8
Reading	8

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Machinist helper - Industry Title

01.0 Maintain a work area.
02.0 Solve basic job-related math problems.
03.0 Interpret basic blueprint information.
04.0 Plan machining operations.
05.0 Perform basic measuring operations.
06.0 Maintain machines and tools.
07.0 Perform benchwork skills.
08.0 Set up and operate power saws.
09.0 Set up and operate pedestal grinders.
10.0 Set up and operate drill presses.
11.0 Demonstrate job communication skills.
12.0 Demonstrate employability skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Machine Operator - Industry Title

13.0 Apply blueprint specifications to production.
14.0 Perform basic precision-measuring operations.
15.0 Sharpen machining tools.
16.0 Operate lathes.
17.0 Operate milling machines.
18.0 Operate grinding machines.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
Machine Setup Operator - OES 91505784

19.0 Solve advanced job-related math problems.

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20.0 Interpret blueprints and machine operations.
21.0 Demonstrate inspection methods.
22.0 Use an arbor press.
23.0 Set up and operate lathes.
24.0 Set up and operate milling machines.
25.0 Set up and operate grinding machines.
26.0 Operate a computerized-numerical-control (CNC) machine.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: General Machining
Secondary Number: 8754000
Postsecondary Number: I480502

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Assistant Machinist - 98999009

01.0 MAINTAIN A WORK AREA--The student will be able to:

- 01.01 Dispose of scrap-metal chips, shavings, trash, and waste.
- 01.02 Maintain a shop area in a clean, orderly, and safe condition.
- 01.03 Comply with shop-safety rules and practices.
- 01.04 Comply with shop-operating guidelines.
- 01.05 Follow the guidelines on material-safety data sheets, including proper handling of hazardous waste and chemicals.

02.0 SOLVE BASIC JOB-RELATED MATH PROBLEMS--The student will be able to:

- 02.01 Solve job-related problems by adding, subtracting, multiplying, and dividing whole numbers, decimals, and common fractions.
- 02.02 Measure a workpiece and compare measurements with blueprint specifications, including tolerances.
- 02.03 Calculate the amount of material that should be removed to obtain correct limits for secondary operations.
- 02.04 Solve job-related problems using mathematical handbooks, charts, and tables.
- 02.05 Calculate machine speed and feed by using appropriate formulas.

03.0 INTERPRET BASIC BLUEPRINT INFORMATION--The student will be able to:

- 03.01 Interpret view concepts.
- 03.02 Interpret lines.
- 03.03 Read and interpret title blocks.
- 03.04 Read and interpret change orders on working and assembly prints.
- 03.05 Read and interpret abbreviations.

04.0 PLAN MACHINING OPERATIONS--The student will be able to:

- 04.01 Comply with safe and efficient work practices.
- 04.02 Perform layout for precision machine work by using layout instruments.
- 04.03 Describe the importance of quality assurance.

05.0 PERFORM BASIC MEASURING OPERATIONS--The student will be able to:

- 05.01 Comply with safe and efficient work practices.
- 05.02 Read and measure with rules and calipers.
- 05.03 Read and measure with micrometers.
- 05.04 Read and measure with vernier tools.

1246

05.05 Use surface-plate techniques.

06.0 MAINTAIN MACHINES AND TOOLS--The student will be able to:

06.01 Comply with safe and efficient work practices.
06.02 Lubricate equipment parts.
06.03 Clean and store hand tools, cutters, fixtures, jigs, and attachments.
06.04 Inspect and repair hand tools.
06.05 Inspect drive pulleys or belts.
06.06 Select lubricants for machining operations.
06.07 Inspect equipment for safe operational conditions.
06.08 Store grinding wheels.
06.09 Store precision tools.
06.10 Inspect and adjust machine guards.
06.11 Inspect work areas to assure a safe working environment.

07.0 PERFORM BENCHWORK SKILLS--The student will be able to:

07.01 Comply with safe and efficient work practices.
07.02 Cut materials by using hand hacksaws.
07.03 Cut threads by using hand taps.
07.04 Cut threads by using dies.
07.05 Deburr workpieces.
07.06 Demonstrate filing techniques.

08.0 SET UP AND OPERATE POWER SAWS--The student will be able to:

08.01 Comply with safe and efficient work practices.
08.02 Remove and replace saw blades.
08.03 Select appropriate blades to perform given sawing operations.
08.04 Select and set speeds and feeds for given sawing operations.
08.05 Measure and cut material using a power saw.
08.06 Saw to scribed lines by using a metal band saw.
08.07 Cut and weld band-saw blades for contour sawing.
08.08 Set up and operate saws for angular cutting.

09.0 SET UP AND OPERATE PEDESTAL GRINDERS--The student will be able to:

09.01 Comply with safe and efficient work practices.
09.02 Identify the parts of the machine and explain their uses.
09.03 Set up support rests.
09.04 Dress grinding wheels.

10.0 SET UP AND OPERATE DRILL PRESSES--The student will be able to:

10.01 Identify the parts of a drill press and explain their uses.
10.02 Identify and set the machine controls.
10.03 Comply with safe and efficient work practices.
10.04 Select the proper tooling.
10.05 Set up and operate drill press for hole work, center drill, drill, ream, countersink, and counterbore.
10.06 Set drill presses for proper feed and speed for specified operations.

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11.0 DEMONSTRATE JOB COMMUNICATION SKILLS--The student will be able to:

11.01 Write logical and understandable statements to convey information to coworkers and supervisors.
11.02 Read and follow written and oral instructions.
11.03 Answer and ask questions coherently and concisely.
11.04 Demonstrate appropriate telephone/communication skills.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Complete a job application form correctly.
12.04 Demonstrate competence in job interview techniques.
12.05 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
12.06 Identify acceptable work habits.
12.07 Demonstrate knowledge of how to make job changes appropriately.
12.08 Demonstrate acceptable employee grooming and hygiene habits.
12.09 Describe the purpose of Florida's "Right-to-Know" law, Florida Statutes, Chapter 442.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Machine Operator - Industry Title

13.0 APPLY BLUEPRINT SPECIFICATIONS TO PRODUCTION--The student will be able to:

13.01 Make shop sketches.
13.02 Identify the costs involved in product production.

14.0 PERFORM BASIC PRECISION-MEASURING OPERATIONS--The student will be able to:

14.01 Comply with safe and efficient work practices.
14.02 Read and measure with dial indicators.
14.03 Read and measure with gage blocks and adjustable gages.
14.04 Take readings using optical comparators.

15.0 SHARPEN MACHINING TOOLS--The student will be able to:

15.01 Comply with safe and efficient work practices.
15.02 Hand sharpen cutting tools by using abrasive stones.
15.03 Grind lathe tools to required angles.
15.04 Sharpen drills.

16.0 OPERATE LATHES--The student will be able to:

16.01 Identify the parts of a lathe and explain their uses.
16.02 Comply with safe and efficient work practices.
16.03 Set up an engine lathe.
16.04 Secure tools, tool holders, and fixtures or attachments.
16.05 Select and set feeds and speeds.
16.06 Set up lathes and face workpieces held in chucks.

16.07 Rough cut and finish cut with lathes.
16.08 Perform lathe filing to deburr parts.
16.09 Drill holes with lathes.
16.10 Countersink holes with lathes.
16.11 Ream holes with lathes.
16.12 Tap threads with lathes.
16.13 Die cut threads with lathes.
16.14 Counterbore holes with lathes.

17.0 OPERATE MILLING MACHINES--The student will be able to:

17.01 Identify the parts of a vertical milling machine and explain their uses.
17.02 Comply with safe and efficient work practices.
17.03 True up the head and align milling fixtures.
17.04 Select and set feeds and speeds for milling work.
17.05 Square up workpieces with a table vise.
17.06 Perform end milling.
17.07 Perform fly-cutting operations.
17.08 Drill holes with milling machines.
17.09 Perform reaming operations.
17.10 Perform form milling.
17.11 Mill an external radius.
17.12 Mill an angle.
17.13 Use an edge finder and wiggler.

18.0 OPERATE GRINDING MACHINES--The student will be able to:

18.01 Identify the parts of a grinding machine and explain their uses.
18.02 Comply with safe and efficient work practices.
18.03 Set up and grind parallel flat surfaces.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
Machine Setup Operator - OES 91505784

19.0 SOLVE ADVANCED JOB-RELATED MATH PROBLEMS--The student will be able to:

19.01 Solve job-related problems using basic formulas, geometry, and trigonometry.
19.02 Convert measurements from English to metric and from metric to English units.

20.0 INTERPRET BLUEPRINTS AND MACHINE OPERATIONS--The student will be able to:

20.01 Read and interpret blueprints, including those with geometric tolerancing.
20.02 Determine and interpret reference information used in performing machine work.
20.03 Comply with safe and efficient work practices.
20.04 Lay out radial and bolt hole circles.
20.05 Inspect, remove, and replace manufactured parts that need repair or machine work.

20.06 Select the most productive tool and tooling for a given operation.

21.0 DEMONSTRATE INSPECTION METHODS--The student will be able to:

21.01 Comply with safe and efficient work practices.
21.02 Measure with sine bars.
21.03 Take readings with hardness testers.
21.04 Explain the purpose of statistical process control (SPC).

22.0 USE AN ARBOR PRESS--The student will be able to:

22.01 Comply with safe and efficient work practices.
22.02 Set up and use an arbor press.

23.0 SET UP AND OPERATE LATHES--The student will be able to:

23.01 Comply with safe and efficient work practices.
23.02 Align lathe centers using accurate methods.
23.03 Bore holes with lathes.
23.04 Knurl parts with lathes.
23.05 Cut external threads with lathes.
23.06 Perform contour, angular, or radii cuts with lathes.
23.07 Set up the faceplate and dog.

24.0 SET UP AND OPERATE MILLING MACHINES--The student will be able to:

24.01 Identify the parts of vertical and horizontal milling machines and explain their uses.
24.02 Select the correct set up and operation for different milling machines.
24.03 Comply with safe and efficient work practices.
24.04 Cut external keyways.
24.05 Bore holes with boring head.
24.06 Mill cylindrical work.
24.07 Set up and perform slab mill operations.
24.08 Use digital readouts.
24.09 Perform straddle milling operations on the horizontal mill.
24.10 Set up and operate power tapping head.

25.0 SET UP AND OPERATE GRINDING MACHINES--The student will be able to:

25.01 Select the proper wheel.
25.02 Comply with safe and efficient work practices.
25.03 Inspect, balance, dress, and true grinding wheels.
25.04 Attach and align workpieces for grinding operations.
25.05 Set up and grind four sides square.
25.06 Select and set feeds and speeds of power-feed grinding machines.
25.07 Cut or part workpieces with grinding machines.
25.08 Set up and use angle plates.
25.09 Grind to a shoulder.
25.10 Grind a taper.

26.0 OPERATE A COMPUTERIZED-NUMERICAL-CONTROL (CNC) MACHINE--The student will be able to:

26.01 Identify parts of a CNC machine and explain their uses.
26.02 Follow safe and efficient work practices, including procedures sheets.
26.03 Identify unusual machine noises.
26.04 Adjust machine speeds and feeds according to specifications.
26.05 Inspect parts for correct dimensions.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754010
Course Title: General Machining 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies on how to maintain a work area, solve job-related math problems, interpret blueprints, operate planing machines, measure, perform maintenance on machines and tools, and use benchwork skills in the machining technology industry. There is no occupational completion point at the conclusion of the first course.

01.0 MAINTAIN A WORK AREA--The student will be able to:

- 01.01 Dispose of scrap-metal chips, shavings, trash, and waste.
- 01.02 Maintain a shop area in a clean, orderly, and safe condition.
- 01.03 Comply with shop-safety rules and practices.
- 01.04 Comply with shop-operating guidelines.
- 01.05 Follow the guidelines on material-safety data sheets, including proper handling of hazardous waste and chemicals.

02.0 SOLVE BASIC JOB-RELATED MATH PROBLEMS--The student will be able to:

- 02.01 Solve job-related problems by adding, subtracting, multiplying, and dividing whole numbers, decimals, and common fractions.
- 02.02 Measure a workpiece and compare measurements with blueprint specifications, including tolerances.
- 02.03 Calculate the amount of material that should be removed to obtain correct limits for secondary operations.
- 02.04 Solve job-related problems using mathematical handbooks, charts, and tables.
- 02.05 Calculate machine speed and feed by using appropriate formulas.

03.0 INTERPRET BASIC BLUEPRINT INFORMATION--The student will be able to:

- 03.01 Interpret view concepts.
- 03.02 Interpret lines.
- 03.03 Read and interpret title blocks.
- 03.04 Read and interpret change orders on working and assembly prints.
- 03.05 Read and interpret abbreviations.

04.0 PLAN MACHINING OPERATIONS--The student will be able to:

- 04.01 Comply with safe and efficient work practices.
- 04.02 Perform layout for precision machine work by using layout instruments.
- 04.03 Describe the importance of quality assurance.

05.0 PERFORM BASIC MEASURING OPERATIONS--The student will be able to:

05.01 Comply with safe and efficient work practices.
05.02 Read and measure with rules and calipers.
05.03 Read and measure with micrometers.
05.04 Read and measure with vernier tools.
05.05 Use surface-plate techniques.

06.0 MAINTAIN MACHINES AND TOOLS--The student will be able to:

06.01 Comply with safe and efficient work practices.
06.02 Lubricate equipment parts.
06.03 Clean and store hand tools, cutters, fixtures, jigs, and attachments.
06.04 Inspect and repair hand tools.
06.05 Inspect drive pulleys or belts.
06.06 Select lubricants for machining operations.
06.07 Inspect equipment for safe operational conditions.
06.08 Store grinding wheels.
06.09 Store precision tools.
06.10 Inspect and adjust machine guards.
06.11 Inspect work areas to assure a safe working environment.

07.0 PERFORM BENCHWORK SKILLS--The student will be able to:

07.01 Comply with safe and efficient work practices.
07.02 Cut materials by using hand hacksaws.
07.03 Cut threads by using hand taps.
07.04 Cut threads by using dies.
07.05 Deburr workpieces.
07.06 Demonstrates filing techniques.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754020
Course Title: General Machining 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies on how to set up and operate power saws, pedestal grinders, and drill presses used in the operations in the machining technology industry. This course also includes development of competencies in communication and employability. Successful completion of General Machining 1 and 2 will prepare students for OCCUPATIONAL COMPLETION POINT DATA CODE A - Assistant Machinist (OES 98999009).

08.0 SET UP AND OPERATE POWER SAWS--The student will be able to:

- 08.01 Comply with safe and efficient work practices.
- 08.02 Remove and replace saw blades.
- 08.03 Select appropriate blades to perform given sawing operations.
- 08.04 Select and set speeds and feeds for given sawing operations.
- 08.05 Measure and cut material using a power saw.
- 08.06 Saw to scribed lines by using a metal band saw.
- 08.07 Cut and weld band-saw blades for contour sawing.
- 08.08 Set up and operate saws for angular cutting.

09.0 SET UP AND OPERATE PEDESTAL GRINDERS--The student will be able to:

- 09.01 Comply with safe and efficient work practices.
- 09.02 Identify the parts of the machine and explain their uses.
- 09.03 Set up support rests.
- 09.04 Dress grinding wheels.

10.0 SET UP AND OPERATE A DRILL PRESSES--The student will be able to:

- 10.01 Identify the parts of a drill press and explain their uses.
- 10.02 Identify and set the machine controls.
- 10.03 Comply with safe and efficient work practices.
- 10.04 Select the proper tooling.
- 10.05 Set up and operate a drill press for hole work, center drill, drill, ream, countersink, and counterbore.
- 10.06 Set drill presses for proper feed and speed for specified operations.

11.0 DEMONSTRATE JOB COMMUNICATION SKILLS--The student will be able to:

- 11.01 Write logical and understandable statements to convey information to coworkers and supervisors.
- 11.02 Read and follow written and oral instructions.
- 11.03 Answer and ask questions coherently and concisely.

11.04 Demonstrate appropriate telephone/communication skills.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Complete a job application form correctly.
12.04 Demonstrate competence in job interview techniques.
12.05 Identify or demonstrate appropriate responses to criticism from employer, supervisor, or other persons.
12.06 Identify acceptable work habits.
12.07 Demonstrate knowledge of how to make job changes appropriately.
12.08 Demonstrate acceptable employee grooming and hygiene habits.
12.09 Describe the purpose of Florida's "Right-to-Know" law, Florida Statutes, Chapter 442.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754030
Course Title: General Machining 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies for operations in the machining technology industry on how to apply blueprint specifications, do basic precision measuring, sharpen machine tools, and operate lathes set up by someone else. There is no occupational completion point at the conclusion of General Machining 3.

13.0 APPLY BLUEPRINT SPECIFICATIONS TO PRODUCTION--The student will be able to:

13.01 Make shop sketches.
13.02 Identify the costs involved in product production.

14.0 PERFORM BASIC PRECISION-MEASURING OPERATIONS--The student will be able to:

14.01 Comply with safe and efficient work practices.
14.02 Read and measure with dial indicators.
14.03 Read and measure with gage blocks and adjustable gages.
14.04 Take readings using optical comparators.

15.0 SHARPEN MACHINING TOOLS--The student will be able to:

15.01 Comply with safe and efficient work practices.
15.02 Hand sharpen cutting tools by using abrasive stones.
15.03 Grind lathe tools to required angles.
15.04 Sharpen drills.

16.0 OPERATE LATHES--The student will be able to:

16.01 Identify the parts of a lathe and explain their uses.
16.02 Comply with safe and efficient work practices.
16.03 Set up an engine lathe.
16.04 Secure tools, tool holders, and fixtures or attachments.
16.05 Select and set feeds and speeds.
16.06 Set up lathes and face workpieces held in chucks.
16.07 Rough cut and finish cut with lathes.
16.08 Perform lathe filing to deburr parts.
16.09 Drill holes with lathes.
16.10 Countersink holes with lathes.
16.11 Ream holes with lathes.
16.12 Tap threads with lathes.
16.13 Die cut threads with lathes.
16.14 Counterbore holes with lathes.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754040
Course Title: General Machining 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies for operations in the machining technology industry on how to operate milling machines set up by someone else. There is no occupational completion point at the conclusion of General Machining 4.

17.0 OPERATE MILLING MACHINES--The student will be able to:

17.01 Identify the parts of a vertical milling machine and explain their uses.
17.02 Comply with safe and efficient work practices.
17.03 True up the head and align milling fixtures.
17.04 Select and set feeds and speeds for milling work.
17.05 Square up workpieces with a table vise.
17.06 Perform end milling.
17.07 Perform fly-cutting operations.
17.08 Drill holes with milling machines.
17.09 Perform reaming operations.
17.10 Perform form milling.
17.11 Mill an external radius.
17.12 Mill an angle.
17.13 Use an edge finder and wiggler.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754050
Course Title: General Machining 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the operation of grinding machines after setup by someone else. Completion of General Machining 3, 4, and 5 prepares the student for ***OCCUPATIONAL COMPLETION POINT - DATA CODE B, MACHINE OPERATOR***--Industry Title.

18.0 OPERATE GRINDING MACHINES--The student will be able to:

18.01 Identify the parts of a grinding machine and explain their uses.
18.02 Comply with safe and efficient work practices.
18.03 Set up and grind parallel flat surfaces.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754060
Course Title: General Machining 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies on how to solve advanced math problems, measure, interpret blueprints, and inspect machine operations in machine setup and operation. There is no occupational completion point at the conclusion of General Machining 6.

19.0 SOLVE ADVANCED JOB-RELATED MATH PROBLEMS--The student will be able to:

19.01 Solve job-related problems using basic formulas, geometry, and trigonometry.
19.02 Convert measurements from English to metric and from metric to English units.

20.0 INTERPRET BLUEPRINTS AND MACHINE OPERATIONS--The student will be able to:

20.01 Read and interpret blueprints, including those with geometric tolerancing.
20.02 Determine and interpret reference information used in performing machine work.
20.03 Comply with safe and efficient work practices.
20.04 Lay out radial and bolt hole circles.
20.05 Inspect, remove, and replace manufactured parts that need repair or machine work.
20.06 Select the most productive tool and tooling for a given operation.

21.0 DEMONSTRATE INSPECTION METHODS--The student will be able to:

21.01 Comply with safe and efficient work practices.
21.02 Measure with sine bars.
21.03 Take readings with hardness testers.
21.04 Explain the purpose of statistical process control (SPC).

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754070
Course Title: Machining 7
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies on how to set up and operate machines, including arbor presses, lathes, and milling machines. Completion of the second of three credits from the following list of outcomes and standards prepares the student for the next two courses in setup and operation of machines, which allows the student to complete the full set of outcomes and standards required of a Machine Set Up Operator. There is no occupational completion point at the conclusion of Machining 7.

22.0 USE AN ARBOR PRESS--The student will be able to:

- 22.01 Comply with safe and efficient work practices.
- 22.02 Set up and use an arbor press.

23.0 SET UP AND OPERATE LATHES--The student will be able to:

- 23.01 Comply with safe and efficient work practices.
- 23.02 Align lathe centers using accurate methods.
- 23.03 Bore holes with lathes.
- 23.04 Knurl parts with lathes.
- 23.05 Cut external threads with lathes.
- 23.06 Perform contour, angular, or radii cuts with lathes.
- 23.07 Set up the faceplate and dog.

24.0 SET UP AND OPERATE MILLING MACHINES--The student will be able to:

- 24.01 Identify the parts of vertical and horizontal milling machines and explain their uses.
- 24.02 Select the correct set up and operation for different milling machines.
- 24.03 Comply with safe and efficient work practices.
- 24.04 Cut external keyways.
- 24.05 Bore holes with boring head.
- 24.06 Mill cylindrical work.
- 24.07 Set up and perform slab mill operations.
- 24.08 Use digital readouts.
- 24.09 Perform straddle milling operations on the horizontal mill.
- 24.10 Set up and operate power tapping head.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754080
Course Title: Machining 8
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the set up and operation of grinding machines. There is no occupational completion point at the conclusion of Machining 8.

25.0 SET UP AND OPERATE GRINDING MACHINES--The student will be able to:

25.01 Select the proper wheel.
25.02 Comply with safe and efficient work practices.
25.03 Inspect, balance, dress, and true grinding wheels.
25.04 Attach and align workpieces for grinding operations.
25.05 Set up and grind four sides square.
25.06 Select and set feeds and speeds of power-feed grinders.
25.07 Cut or part workpieces with grinding machines.
25.08 Set up and use angle plates.
25.09 Grind to a shoulder.
25.10 Grind a taper.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754090
Course Title: Machining 9
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop competencies in the operation of machines after set up by someone else. Completion of General Machining 6, 7, 8, and 9 prepares the student for ***OCCUPATIONAL COMPLETION POINT - DATA CODE C, MACHINE SETUP OPERATOR--OES*** 91505784.

26.0 OPERATE A COMPUTERIZED-NUMERICAL-CONTROL (CNC) MACHINE--The student will be able to:

26.01 Identify parts of a CNC machine and explain their uses(s).
26.02 Follow safe and efficient work practices, including procedures sheets.
26.03 Identify unusual machine noises.
26.04 Adjust machine speeds and feeds according to specifications.
26.05 Inspect parts for correct dimensions.

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Florida Department of Education
INTENDED OUTCOMES

Program Title: Machining

	PSAV
Program Number:	**I480503**
CIP Number:	0648050300
Grade Level:	30, 31
Length:	1,800 Hours
Certification:	MACH SHOP @7 G METAL WORK @7 G TOOL DIE @7 G
Basic-Skills Grade Level:	
Math	8
Language	8
Reading	8

INTENDED OUTCOMES: After successfully completing the appropriate content for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Assistant Machinist

01.0 Maintain a work area.
02.0 Solve basic job-related math problems.
03.0 Interpret basic blueprint information.
04.0 Plan machining operations.
05.0 Perform basic measuring operations.
06.0 Maintain machines and tools.
07.0 Perform benchwork skills.
08.0 Set up and operate power saws.
09.0 Set up and operate pedestal grinding machines.
10.0 Set up and operate drill presses.
11.0 Demonstrate job communication skills.
12.0 Demonstrate employability skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Machine Operator - Industry Title

13.0 Apply blueprint specifications to production.
14.0 Perform basic precision-measuring operations.
15.0 Sharpen machining tools.
16.0 Operate lathes.
17.0 Operate milling machines.
18.0 Operate grinding machines.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
Machine Setup Operator - OES 91505784

19.0 Solve advanced job-related math problems.
20.0 Interpret blueprints and machine operations.
21.0 Demonstrate inspection methods.
22.0 Use an arbor press.
23.0 Set up and operate lathes.
24.0 Set up and operate milling machines.
25.0 Set up and operate grinding machines.
26.0 Operate a computerized-numerical-control (CNC) machine.

OCCUPATIONAL COMPLETION POINT - DATA CODE D

Machinist - OES 89108701

27.0 Set up and operate a computerized-numerical-control (CNC) machine.
28.0 Use computer-aided design/computer-aided manufacturing (CAD/CAM) processes .
29.0 Operate an electrical discharge machine (EDM).
30.0 Set up an EDM .
31.0 Perform advanced lathe operations.
32.0 Perform advanced milling operations.
33.0 Perform advanced grinding operations.
34.0 Set up and operate a tool and cutter grinder.
35.0 Set up and operate heat-treating furnaces .
36.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Machining
Secondary Number:
Postsecondary Number: I480503

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Assistant Machinist

OCCUPATIONAL COMPLETION POINT - DATA CODE B
Machine Operator - Industry Title
CORE General Machining 3, 4, 5

OCCUPATIONAL COMPLETION POINT - DATA CODE C
Machine Setup Operator - OES 91505784
CORE General Machining 3, 4, 5, 6,
Machinist 7, 8, 9

OCCUPATIONAL COMPLETION POINT - DATA CODE D
Machinist - OES 89108701

27.0 SET UP AND OPERATE A COMPUTERIZED-NUMERICAL-CONTROL (CNC) MACHINE--The student will be able to:

27.01 Comply with safe and efficient work practices.
27.02 Set up work holding devices.
27.03 Select proper cutting tools.
27.04 Write a basic program and apply basic programming skills.
27.05 Adjust appropriate cutting tools and tool offsets.
27.06 Machine parts to blueprint tolerances.

28.0 USE COMPUTER-AIDED DESIGN/COMPUTER-AIDED MANUFACTURING (CAD/CAM) PROCESSES--The student will be able to:

28.01 Identify parts of the machine and explain their uses.
28.02 Identify CAD/CAM processes.
28.03 Comply with safe and efficient work practices.
28.04 Create a multidimensional geometry of parts.
28.05 Create a CNC code from parts geometry.
28.06 Set up and manufacture parts.

29.0 OPERATE AN ELECTRICAL DISCHARGE MACHINE (EDM)--The student will be able to:

29.01 Identify parts of the machine and explain their uses.
29.02 Comply with safe and efficient work practices.
29.03 Follow procedures sheets.

30.0 SET UP AN EDM--The student will be able to:

30.01 Set up and adjust machine controls according to specifications .

30.02 Select and manufacture electrode .
30.03 Select flushing techniques .
30.04 Produce part according to specifications .
30.05 Perform wire EDM programming .

31.0 PERFORM ADVANCED LATHE OPERATIONS--The student will be able to:

31.01 Rechase threads with lathes.
31.02 Cut internal threads with lathes.
31.03 Set up and perform taper turning with taper attachments.
31.04 Set up and perform taper turning with the compound rest.
31.05 Cut internal tapered surfaces.
31.06 Set up and use follower and steady rests.

32.0 PERFORM ADVANCED MILLING OPERATIONS--The student will be able to:

32.01 Perform indexing operations using a dividing head.
32.02 Set up and operate rotary tables.

33.0 PERFORM ADVANCED GRINDING OPERATIONS--The student will be able to:

33.01 Set up grinders to run workpieces between centers.
33.02 Set up and use radius dressers.
33.03 Operate cylindrical grinders.
33.04 Set up and operate inside diameter (ID) grinders .

34.0 SET UP AND OPERATE A TOOL AND CUTTER GRINDER--The student will be able to:

34.01 Identify the parts of the machine and explain their uses.
34.02 Identify and select proper machine controls.
34.03 Comply with safe and efficient work practices.
34.04 Select proper work holding devices.
34.05 Perform truing, dressing, and forming operations to blueprint specifications.
34.06 Compute proper speeds.
34.07 Sharpen an end mill.
34.08 Sharpen a horizontal milling cutter .

35.0 SET UP AND OPERATE HEAT-TREATING FURNACES--The student will be able to:

35.01 Identify the parts of the machine and explain their uses.
35.02 Identify and select proper machine controls.
35.03 Comply with safe and efficient work practices.
35.04 Select and identify proper heat-treatment processes.
35.05 Perform a basic heat-treatment process to blueprint specifications.

36.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

36.01 Define entrepreneurship.

36.02 Describe the importance of entrepreneurship to the American economy.

36.03 List the advantages and disadvantages of business ownership.

36.04 Identify the risks involved in ownership of a business.

36.05 Identify the necessary personal characteristics of a successful entrepreneur.

36.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Manufacturing Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.060302
Grade Level	College Credits
Length	AS Degree/64
Certification	

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment or production planner (012.167-050), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and a combination of theory and laboratory activities to gain the necessary cognitive and manipulative skills to analyze data, make resource utilization decisions and manage a manufacturing oriented facility.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Manufacturing industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in computer control, technical communications, maintenance of electromechanical components, quality control, material handling, and time and motion studies.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Plan and schedule production processing and material utilization.
02.0 Develop employee job standards and conduct time and motion and cost control studies.
03.0 Perform purchasing and resource identification activities.
04.0 Perform computer control functions.
05.0 Plan, develop and implement communication processes.
06.0 Maintain electromechanical components.
07.0 Develop and implement processes for material handling and quality control and reliability.
08.0 Demonstrate appropriate communication skills.
09.0 Demonstrate appropriate math skills.
10.0 Demonstrate appropriate understanding of basic science.
11.0 Demonstrate employability skills.
12.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Manufacturing Technology
Secondary Number:
Postsecondary Number: 0615.060302

01.0 PLAN AND SCHEDULE PRODUCTION PROCESSING AND MATERIAL UTILIZATION--The student will be able to:

01.01 Schedule jobs.
01.02 Requisition materials.
01.03 Organize assembly lines.
01.04 Assign personnel to equipment and positions.
01.05 Control shop flow of jobs.
01.06 Conduct in-process inspectors.
01.07 Direct assembly of components into final products.
01.08 Conduct final test and inspection.
01.09 Direct packaging.
01.10 Direct shipping or transfer to customer or warehouse.

02.0 DEVELOP EMPLOYEE JOB STANDARDS AND CONDUCT TIME AND MOTION AND COST CONTROL STUDIES--The student will be able to:

02.01 Conduct time and motion studies.
02.02 Establish and write employee job standards.
02.03 Develop cost central data.
02.04 Analyze cost central reports.
02.05 Analyze production methods and processes.
02.06 Analyze and integrate processes into total systems.
02.07 Write job descriptions.
02.08 Complete job status reports.
02.09 Analyze job evaluation.

03.0 PERFORM PURCHASING AND RESOURCE IDENTIFICATION ACTIVITIES--The student will be able to:

03.01 Advise on "make or buy" decisions.
03.02 Identify services of supply.
03.03 Obtain bids or quotations.
03.04 Select vendor.
03.05 Prepare and issue purchase requisition.
03.06 Receive and inspect incoming materials.
03.07 Average distribution of materials.

04.0 PERFORM COMPUTER CONTROL FUNCTIONS--The student will be able to:

04.01 Make computer application analysis.
04.02 Process CAD/CAM program.
04.03 Write a program.
04.04 Program micro-processors.
04.05 Make adjustments to programs.
04.06 Evaluate robotic applications.

05.0 PLAN, DEVELOP, AND IMPLEMENT COMMUNICATION PROCESSES--The student will be able to:

05.01 Write production reports.
05.02 Write technical reports.
05.03 Illustrate report with charts, diagrams and graphs.
05.04 Prepare and deliver report.
05.05 Plan technical training for employees.

06.0 MAINTAIN ELECTROMECHANICAL COMPONENTS--The student will be able to:

06.01 Interpret blue prints, schematics, and technical manuals.
06.02 Establish operating maintenance schedule.
06.03 Analyze system failures.
06.04 Make minor repairs in equipment.
06.05 Coordinate maintenance services.
06.06 Evaluate need for equipment replacement.

07.0 DEVELOP AND IMPLEMENT PROCESSES FOR MATERIAL HANDLING AND QUALITY CONTROL AND RELIABILITY--The student will be able to:

07.01 Establish system for handling and storing material in process.
07.02 Establish a system for handling and storing finished material.
07.03 Develop quality control.
07.04 Prepare deviations from specifications evaluation.
07.05 Investigate equipment failures.
07.06 Conduct quality tests under varying environmental conditions.

08.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

08.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
08.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
08.03 Read and follow written and oral instructions.
08.04 Answer and ask questions coherently and concisely.
08.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
08.06 Demonstrate appropriate telephone/communication skills.

09.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

09.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
09.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
09.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
09.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

09.05 Demonstrate an understanding of federal, state and local taxes and their computation.

10.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

10.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
10.02 Draw conclusions or make inferences from data.
10.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
10.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

11.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

11.01 Conduct a job search.
11.02 Secure information about a job.
11.03 Identify documents which may be required when applying for a job interview.
11.04 Complete a job application form correctly.
11.05 Demonstrate competence in job interview techniques.
11.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
11.07 Identify acceptable work habits.
11.08 Demonstrate knowledge of how to make job changes appropriately.
11.09 Demonstrate acceptable employee health habits.
11.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

12.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

12.01 Define entrepreneurship.
12.02 Describe the importance of entrepreneurship to the American economy.
12.03 List the advantages and disadvantages of business ownership.
12.04 Identify the risks involved in ownership of a business.
12.05 Identify the necessary personal characteristics of a successful entrepreneur.
12.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Marine Mechanics Technology	
Occupational Area:	Industrial Education	
	Secondary	
Program Numbers	**8751000**	**I490306**
CIP Number	0649.030600	0649.030600
Grade Level	9-12, 30, 31	30,31
Length	6 credits	1800 hours
Certification	DESEL MECH @7 G GASENG RPR @7 G	DESEL MECH @7 G GASENG RPR @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as machinery mechanics; marine engines (85116626), or outboard motor mechanics (625.131-010). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content will include the following: service, repair and overhaul of four-stroke and two-stroke cycle engines and outboard motors; and service and repair of boating accessories. With regard to the above, course content will include electrical systems, fuel systems, power transfer systems, ignition systems, cooling systems, lubrication systems, drive systems and boat and trailer rigging.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

Listed below are the courses that comprise this program when offered at the secondary level:

8751010 - Marine Mechanics 1
8751020 - Marine Mechanics 2
8751030 - Marine Mechanics 3
8751040 - Marine Mechanics 4
8751050 - Marine Mechanics 5
8751060 - Marine Mechanics 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Marine Service industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: tools, test equipment,

welding procedures, current model outboard motors, inboard-outdrive motors, location and installation of accessories, boat trailers, and operational testing.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

When a student with a disability is enrolled in a vocational class for which modifications to the curriculum framework have been made, the particular outcomes and student performance standards that the student must master to earn credit must be specified in the student's individual educational plan (IEP). Modifications must be approved by the FAA. Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 9.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1800 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Perform shop practices to industry standards.
02.0 Maintain and repair basic four-stroke cycle engines.

03.0 Maintain and repair basic two-stroke cycle engines.
04.0 Maintain and repair electrical systems.
05.0 Maintain and repair cranking systems.
06.0 Maintain and repair magneto ignition systems.
07.0 Maintain and repair battery ignition systems.
08.0 Maintain and repair capacitor discharge ignition systems.
09.0 Maintain and repair outboard charging systems.
10.0 Maintain and repair fuel systems.
11.0 Maintain and repair two-stroke cycle carburetors.
12.0 Maintain and repair inboard gas systems.
13.0 Maintain and repair cooling systems.
14.0 Maintain and repair lubrication systems.
15.0 Maintain and repair intermediate housings.
16.0 Maintain and repair stern drive upper gear case.
17.0 Perform upper to lower gear case maintenance.
18.0 Maintain and repair lower gear cases.
19.0 Maintain and repair transmissions.
20.0 Assemble and maintain outboard lower units and housing assemblies.
21.0 Use marine woods, metals and fiberglass.
22.0 Adjust and repair trailers.
23.0 Prepare and deliver sales merchandise.
24.0 Maintain and repair inboard diesel systems.
25.0 Demonstrate appropriate communication skills.
26.0 Demonstrate appropriate math skills.
27.0 Demonstrate appropriate understanding of basic science.
28.0 Demonstrate employability skills.
29.0 Demonstrate and understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Marine Mechanics Technology
Secondary Number: 8751000
Postsecondary Number: I490306

01.0 PERFORM SHOP PRACTICES TO INDUSTRY STANDARDS--The student will be able to:

- 01.01 Comply with safety rules and regulations.
- 01.02 Use hand tools safely and properly.
- 01.03 Set up and use power tools safely and properly.
- 01.04 Set up and use precision measuring tools.
- 01.05 Drill and remove broken studs and install helicoils.
- 01.06 Identify threaded fasteners by size, type, thread series, thread classes, material hardness and compatibility.
- 01.07 Identify and make gaskets and seals.
- 01.08 Read and use parts manuals.
- 01.09 Read, interpret and apply service manuals.
- 01.10 Locate and match electrical units by their symbols on a wiring diagram.

02.0 MAINTAIN AND REPAIR BASIC FOUR-STROKE CYCLE ENGINES--The student will be able to:

- 02.01 Explain the basic principles of the operation of four-stroke cycle internal combustion engines.
- 02.02 Identify types of four-stroke cycle engines.
- 02.03 Locate engine serial and model numbers.
- 02.04 Identify engine assemblies and systems.
- 02.05 Diagnose valve and head problems by use of the visual inspection method.
- 02.06 Diagnose valve and head problems by use of the compression tester method.
- 02.07 Diagnose valve and head problems by use of the cylinder air pressure method.
- 02.08 Disassemble engines and inspect parts.
- 02.09 Clean and inspect heads for cracks, warpage and damaged spark plug threads.
- 02.10 Inspect valves for warpage, burns, cracks, stem wear, tip wear and margin.
- 02.11 Grind valve seats and reface valves.
- 02.12 Check and inspect springs for free height, distortion and installed height.
- 02.13 Adjust valve lash.
- 02.14 Move and inspect camshafts and lifters.
- 02.15 Measure camshafts.
- 02.16 Clean and inspect lifters for wear.
- 02.17 Time valve drive assemblies.
- 02.18 Remove pistons from rod assemblies.
- 02.19 Measure out-of-round and cylinder taper with a dial bore gage or micrometer.

02.20 Check piston pins and bosses for wear.
02.21 Measure piston ring lands width, out-of-round and taper.
02.22 Measure the piston ring gap in cylinder bores.
02.23 Install and fit piston pins.
02.24 Check rod and piston assembly alignment.
02.25 Remove and replace rod bearings.
02.26 Hone and clean cylinders.
02.27 Install rings on pistons.
02.28 Measure and check crankshafts with a micrometer.
02.29 Check for end play.
02.30 Check bearing bores with a telescoping gage.
02.31 Reassemble engines.
02.32 Install oil seals.

03.0 MAINTAIN AND REPAIR BASIC TWO-STROKE CYCLE ENGINES--The student will be able to:

03.01 Explain the basic principles of the operation of two-stroke cycle internal combustion engines.
03.02 Identify types of engines.
03.03 Locate engine serial and model numbers.
03.04 Identify engine assemblies and systems.
03.05 Disassemble engines.
03.06 Remove, clean and inspect heads for cracks, warpage and damaged spark plug threads.
03.07 Diagnose had problems by use of the visual inspection method.
03.08 Diagnose head problems by use of the compression tester method.
03.09 Diagnose head problems by use of cylinder air pressure method.
03.10 Diagnose head problems by use of the stethoscope method.
03.11 Remove, clean and inspect piston rods and assemblies.
03.12 Measure out-of-round of pistons and cylinders.
03.13 Hone cylinders.
03.14 Check the total bearing surface of connecting rod bearings.
03.15 Measure piston skirts and ring grooves.
03.16 Measure the piston ring gap in cylinder bores.
03.17 Install piston pins according to manufacturer's specifications.
03.18 Check rod and piston assembly alignment.
03.19 Install rings on pistons.
03.20 Install piston rod assemblies.
03.21 Measure and check crankshafts with a micrometer.
03.22 Check needle bearings.
03.23 Inspect crankshafts and install seal.
03.24 Inspect, clean and/or replace reed valves.
03.25 Reassemble engines.

04.0 MAINTAIN AND REPAIR ELECTRICAL SYSTEMS--The student will be able to:

04.01 Set up and use voltmeters, ammeters and ohmmeters.
04.02 Locate and identify electrical circuit components.
04.03 Sketch a typical circuit using a single wire system.
04.04 Test storage batteries using a hydrometer.
04.05 Test storage batteries using a light and load test.
04.06 Charge storage batteries.
04.07 Remove and replace batteries and service battery boxes.

04.08 Repair damaged wire and electrical harnesses.
04.09 Diagnose circuit troubles using continuity or a test light and low reading voltmeters to record voltage drop.
04.10 Sketch and label typical fuel gage systems.
04.11 Remove and replace ammeters or indicating lights.
04.12 Remove and replace fuel gages.
04.13 Remove and replace fuel sending units.
04.14 Diagnose gages and accessory system troubles using test lights, voltmeters, ammeters or detached sending units.

04.15 Sketch typical circuits such as those for auto bilge pumps or navigation lights.
04.16 Locate opens, shorts and grounds.

05.0 MAINTAIN AND REPAIR CRANKING SYSTEMS--The student will be able to:

05.01 Disassemble recoil starters.
05.02 Inspect components of recoil starters.
05.03 Reassemble recoil starters.
05.04 Identify components of electrical starting systems.
05.05 Disassemble different types of starting motors.
05.06 Bench test armatures.
05.07 Bench test field coils.
05.08 Bench test drive units.
05.09 Bench test switches.
05.10 Bench test minor parts of starting motor components.
05.11 Use armature lathes for turning commutators.
05.12 Install, reassemble and test new starter parts.
05.13 Troubleshoot starting systems using battery starter testers.
05.14 Troubleshoot starting systems using voltmeters for finding excessive voltage drop.
05.15 Recondition solenoids, drives and other components.
05.16 Set up and use battery starter (load) testers.
05.17 Locate opens, shorts and grounds.

06.0 MAINTAIN AND REPAIR MAGNETO IGNITION SYSTEMS--The student will be able to:

06.01 Sketch and label electrical symbols.
06.02 Set up and use ohmmeters.
06.03 Set up and use voltmeters.
06.04 Set up and use ignition testers.
06.05 Set up and use ignition analyzers.
06.06 Locate and identify parts of magneto ignitions.
06.07 Locate and match electrical units by their symbols on a wiring diagram.
06.08 Sketch and label complete magneto ignition systems.
06.09 Check coil resistance with an ohmmeter.
06.10 Check points for continuity and resistance.
06.11 Check condensers for capacity, leaks and shorts.
06.12 Clean and regap spark plugs.

07.0 MAINTAIN AND REPAIR BATTERY IGNITION SYSTEMS--The student will be able to:

07.01 Locate and identify parts of battery ignition systems.
07.02 Locate and match electrical units by their symbols on a wiring diagram.
07.03 Sketch and label complete battery ignition systems.
07.04 Check coil resistance with an ohmmeter.
07.05 Check points for continuity and resistance.
07.06 Check condensers for capacity, leaks and shorts.
07.07 Set up and use test equipment.
07.08 Set timing using a timing light.

08.0 MAINTAIN AND REPAIR CAPACITOR DISCHARGE IGNITION SYSTEMS--The student will be able to:

08.01 Sketch and label electrical symbols.
08.02 Set up and use ohmmeters.
08.03 Set up and use a CD-77
08.04 Set up and use spark testers.
08.05 Set up and use neon test lights.
08.06 Set up and use low/high ammeters.
08.07 Set up and use voltmeters.
08.08 Locate and identify parts of capacitor discharge ignition systems.
08.09 Locate and match electrical units by their symbols on a wiring diagram.
08.10 Sketch and label complete C/D ignition systems.
08.11 Check coil resistance, shorts and grounds with an ohmmeter.
08.12 Check stator windings with an ohmmeter.
08.13 Check sensor coils, charge coils, ignition coils and shorts to ground with a CD-77.
08.14 Check power packs with an ohmmeter and a CD-77.

09.0 MAINTAIN AND REPAIR OUTBOARD CHARGING SYSTEMS--The student will be able to:

09.01 Sketch and label the units of complete charging circuits.
09.02 Disassemble charging systems and identify the components.
09.03 Perform stator and rectifier testing on charging systems.
09.04 Reassemble and test charging systems.
09.05 Set up and use ohmmeters.
09.06 Test regulators.
09.07 Reassemble and test complete units.

10.0 MAINTAIN AND REPAIR FUEL SYSTEMS--The student will be able to:

10.01 Identify and locate fuel system components (fuel tanks, lines, filters, etc.).
10.02 Sketch and label the parts of total fuel systems.
10.03 Service fuel lines.
10.04 Remove, clean and install fuel tanks.
10.05 Identify and locate fuel pump vacuums.
10.06 Remove, replace service and check the pressure of fuel pumps.

10.07 Remove, clean and replace in-line filters.
10.08 Identify the major types of carburetors.
10.09 Check and adjust throttle and governor linkages.

11.0 MAINTAIN AND REPAIR TWO-STROKE CYCLE CARBURETORS--The student will be able to:

11.01 Sketch and label the parts of total fuel systems.
11.02 Service fuel lines and primer bulbs (vacuum test).
11.03 Remove, clean, inspect and install fuel tanks.
11.04 Identify basic carburetor circuits (chokes, floats, fuel inlets; idle, intermediate and high speeds; mains, etc.)
11.05 Identify and locate fuel pumps.
11.06 Remove, inspect and replace fuel pumps.
11.07 Remove, clean, overhaul, replace and make final adjustments to carburetors.
11.08 Remove, service and replace air cleaners.
11.09 Diagnose carburetor problems.
11.10 Remove, inspect and replace reed valves and gaskets.
11.11 Diagnose exhaust problems such as back pressure and scavenging.
11.12 Inspect and service oil metering systems.
11.13 Determine and make appropriate fuel-oil mixtures.

12.0 MAINTAIN AND REPAIR INBOARD GAS SYSTEMS--The student will be able to:

12.01 Remove, service and replace carburetor air cleaners/flame arrestors.
12.02 Identify and locate fuel system components (fuel pumps, carburetors and air filters, linkages and intake manifolds).
12.03 Remove, clean, overhaul, replace and make final adjustments to carburetors.

13.0 MAINTAIN AND REPAIR COOLING SYSTEMS--The student will be able to:

13.01 Explain the principles of cooling systems, including fresh water cooling systems.
13.02 Trace water flow through cooling systems.
13.03 Disassemble and reassemble water pumps.
13.04 Remove, check and replace thermostats.
13.05 Use thermostat pressure relief systems.
13.06 Service manifolds, risers and thermostat housings.
13.07 Service water cooling systems for gas inboard, gas outboard and diesel engines.

14.0 MAINTAIN AND REPAIR LUBRICATION SYSTEMS--The student will be able to:

14.01 Identify the types and functions of lubrication systems.
14.02 Explain the principles of lubrication systems.
14.03 Identify and locate components of lubrication systems.
14.04 Check engines for oil leaks.
14.05 Change engine oil and filters.
14.06 Check engine oil pressure and level.
14.07 Recognize and use only recommended oil.

15.0 MAINTAIN AND REPAIR INTERMEDIATE HOUSINGS--The student will be able to:

15.01 Disassemble main drive shafts.
15.02 Shim drive shafts to intermediate housings.
15.03 Remove and replace clutch assemblies.
15.04 Check electrical components with proper test equipment.
15.05 Remove and replace "U" joints.
15.06 Disassemble outer transom plates.
15.07 Adjust trim and limit switches.
15.08 Disassemble cylinder rams.

16.0 MAINTAIN AND REPAIR STERN DRIVE UPPER GEAR CASE--The student will be able to:

16.01 Determine the differences between mechanical, electrical and hydraulic shifting units.
16.02 Disassemble and reassemble each type of shifting unit.
16.03 Reshim units to manufacturers' specifications.
16.04 Use the proper oil to refill upper and lower gear cases.

17.0 PERFORM UPPER TO LOWER GEAR CASE MAINTENANCE--The student will be able to:

17.01 Disassemble exhaust housings.
17.02 Inspect seals, "O" rings, shafts and bearings.
17.03 Reassemble exhaust housings.

18.0 MAINTAIN AND REPAIR LOWER GEAR CASES--The student will be able to:

18.01 Determine the differences between mechanical, electrical and hydraulic shifting.
18.02 Remove and replace lower gear cases.
18.03 Reshim lower gear cases.
18.04 Refill lower gear cases with specified oil.
18.05 Determine propeller pitch, diameter and hub type.

19.0 MAINTAIN AND REPAIR TRANSMISSIONS--The student will be able to:

19.01 Inspect planetary clutch plate air coupling assemblies
19.02 Remove and replace transmissions.
19.03 Use proper service tools in shimming, reassembly and testing.
19.04 Drain transmissions.
19.05 Determine capacity using the transmission service manuals.
19.06 Refill transmissions according to manufacturers' specifications.

20.0 ASSEMBLE AND MAINTAIN OUTBOARD LOWER UNITS AND HOUSING ASSEMBLIES--The student will be able to:

20.01 Disassemble and reassemble steering handle groups.
20.02 Disassemble and assemble exhaust housings and water tube assemblies.
20.03 Replace motor mounts and shock absorbers.
20.04 Lubricate all fittings.

20.05 Pressure and vacuum test gear cases.
20.06 Remove and test cylinders and rams.
20.07 Adjust reverse locks.
20.08 Adjust the trim and tilt.
20.09 Determine the differences between mechanical, electrical and hydraulic shifting units.
20.10 Explain the shifting theory of the lower unit.
20.11 Disassemble and reassemble mechanical shifting units.
20.12 Disassemble and reassemble electrical shifting units.
20.13 Disassemble and reassemble hydraulic shifting units.
20.14 Inspect all parts for wear.

21.0 USE MARINE WOODS, METALS, AND FIBERGLASS--The student will be able to:

21.01 Explain the hazards of a marine environment to woods, metals and fiberglass.
21.02 Explain a galvanic series.
21.03 Explain the theory for using given materials in boat repair activities.

22.0 ADJUST AND REPAIR TRAILERS--The student will be able to:

22.01 Make boat to trailer adjustments.
22.02 Remove and replace lighting systems.
22.03 Remove and replace wheel bearings and springs.
22.04 Remove and replace brakes.
22.05 Disassemble, diagnose and reassemble trim and tilt systems.
22.06 Remove and test cylinder rams.
22.07 Adjust reverse locks.
22.08 Adjust the trim and tilt.

23.0 PREPARE AND DELIVER SALES MERCHANDISE--The student will be able to:

23.01 Make center line measurements for outboard motor installation.
23.02 Center the plate height.
23.03 Locate manufacturers' I.D. plates.
23.04 Mount control boxes at the helm.
23.05 Place wiring and cables in a neat and orderly manner.
23.06 Adjust the control cables from the engine to the control box.
23.07 Center the steering cable to the engine.
23.08 Find suitable locations for accessories and mount them to the boat.
23.09 Lubricate shafts, install propellers and fasten both securely.
23.10 Check for proper levels.
23.11 Check manufacturers' specifications.
23.12 Test-run boats.
23.13 Recheck work completed.
23.14 Check manufacturers' installation procedures for stern drive units.
23.15 Lubricate shafts and install propellers securely.
23.16 Obtain maximum oil level capacity.
23.17 Install or connect drain plugs, pet cocks, hose clamps, hoses, etc.

23.18 Find a suitable mount location and mount the engine securely in the boat.
23.19 Set engines to manufacturers' specifications.
23.20 Set, adjust and test engines to manufacturers' specifications.
23.21 Remove and replace running lights.
23.22 Troubleshoot lighting systems and accessories.
23.23 Check and adjust throttles, cables, horns, lights and tachometers.

24.0 MAINTAIN AND REPAIR INBOARD/DIESEL SYSTEMS--The student will be able to:

24.01 Inspect, remove and replace alternator belts.
24.02 Check the output of charging systems.
24.03 Analyze malfunctions.
24.04 Test and overhaul alternators.
24.05 Remove and replace regulators.
24.06 Identify and locate fuel system components (fuel tanks, fuel lines, fuel pumps, air filters, governors and linkages and fuel injectors.)
24.07 Check fuel systems for leaks.
24.08 Bleed systems for starting.
24.09 Adjust nozzle pressure to manufacturer's specifications.
24.10 Set the injection pump angle (timing).
24.11 Check and adjust the throttle and governor linkage.
24.12 Check or replace glow plugs.
24.13 Check stop solenoids.

25.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

25.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
25.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
25.03 Read and follow written and oral instructions.
25.04 Answer and ask questions coherently and concisely.
25.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
25.06 Demonstrate appropriate telephone/communication skills.

26.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

26.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
26.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
26.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
26.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
26.05 Demonstrate an understanding of federal, state and local taxes and their computation.

27.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

27.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
27.02 Draw conclusions or make inferences from data.
27.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
27.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

28.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

28.01 Conduct a job search.
28.02 Secure information about a job.
28.03 Identify documents that may be required when applying for a job.
28.04 Complete a job application form correctly.
28.05 Demonstrate competence in job interview techniques.
28.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
28.07 Identify acceptable work habits.
28.08 Demonstrate knowledge of how to make appropriate job changes.
28.09 Demonstrate acceptable employee health habits.
28.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

29.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

29.01 Define entrepreneurship.
29.02 Describe the importance of entrepreneurship to the American economy.
29.03 List the advantages and disadvantages of business ownership.
29.04 Identify the risks involved in ownership of a business.
29.05 Identify the necessary personal characteristics of a successful entrepreneur.
29.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751010
Course Title: Marine Mechanics 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for performing shop practices to industry standards and employability skills.

01.0 PERFORM SHOP PRACTICES TO INDUSTRY STANDARDS--The student will be able to:

- 01.01 Comply with safety rules and regulations.
- 01.02 Use hand tools safely and properly.
- 01.03 Set up and use power tools safely and properly.
- 01.04 Set up and use precision measuring tools.
- 01.05 Drill and remove broken studs and install helicoils.
- 01.06 Identify threaded fasteners by size, type, thread series, thread classes, material hardness and compatibility.
- 01.07 Identify and make gaskets and seals.
- 01.08 Read and use parts manuals.
- 01.09 Read, interpret and apply service manuals.
- 01.10 Locate and match electrical units by their symbols on a wiring diagram.

28.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 28.01 Conduct a job search.
- 28.02 Secure information about a job.
- 28.03 Identify documents that may be required when applying for a job.
- 28.04 Complete a job application form correctly.
- 28.05 Demonstrate competence in job interview techniques.
- 28.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
- 28.07 Identify acceptable work habits.
- 28.08 Demonstrate knowledge of how to make appropriate job changes.
- 28.09 Demonstrate acceptable employee health habits.
- 28.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751020
Course Title: Marine Mechanics 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for maintaining and repairing basic four-stroke cycle engines and two-stroke cycle engines.

02.0 MAINTAIN AND REPAIR BASIC FOUR-STROKE CYCLE ENGINES--The student will be able to:

- 02.01 Explain the basic principles of the operation of four-stroke cycle internal combustion engines.
- 02.02 Identify types of four-stroke cycle engines.
- 02.03 Locate engine serial and model numbers.
- 02.04 Identify engine assemblies and systems.
- 02.05 Diagnose valve and head problems by use of the visual inspection method.
- 02.06 Diagnose valve and head problems by use of the compression tester method.
- 02.07 Diagnose valve and head problems by use of the cylinder air pressure method.
- 02.08 Disassemble engines and inspect parts.
- 02.09 Clean and inspect heads for cracks, warpage and damaged spark plug threads.
- 02.10 Inspect valves for warpage, burns, cracks, stem wear, tip wear and margin.
- 02.11 Grind valve seats and reface valves.
- 02.12 Check and inspect springs for free height, distortion and installed height.
- 02.13 Adjust valve lash.
- 02.14 Move and inspect camshafts and lifters.
- 02.15 Measure camshafts.
- 02.16 Clean and inspect lifters for wear.
- 02.17 Time valve drive assemblies.
- 02.18 Remove pistons from rod assemblies.
- 02.19 Measure out-of-round and cylinder taper with a dial bore gage or micrometer.
- 02.20 Check piston pins and bosses for wear.
- 02.21 Measure piston ring lands width, out-of-round and taper.
- 02.22 Measure the piston ring gap in cylinder bores.
- 02.23 Install and fit piston pins.
- 02.24 Check rod and piston assembly alignment.
- 02.25 Remove and replace rod bearings.
- 02.26 Hone and clean cylinders.
- 02.27 Install rings on pistons.
- 02.28 Measure and check crankshafts with a micrometer.

02.29 Check for end play.
02.30 Check bearing bores with a telescoping gage.
02.31 Reassemble engines.
02.32 Install oil seals.

03.0 MAINTAIN AND REPAIR BASIC TWO-STROKE CYCLE ENGINES--The student will be able to:

03.01 Explain the basic principles of the operation of two-stroke cycle internal combustion engines.
03.02 Identify types of engines.
03.03 Locate engine serial and model numbers.
03.04 Identify engine assemblies and systems.
03.05 Disassemble engines.
03.06 Remove, clean and inspect heads for cracks, warpage and damaged spark plug threads.
03.07 Diagnose had problems by use of the visual inspection method.
03.08 Diagnose head problems by use of the compression tester method.
03.09 Diagnose head problems by use of cylinder air pressure method.
03.10 Diagnose head problems by use of the stethoscope method.
03.11 Remove, clean and inspect piston rods and assemblies.
03.12 Measure out-of-round of pistons and cylinders.
03.13 Hone cylinders.
03.14 Check the total bearing surface of connecting rod bearings.
03.15 Measure piston skirts and ring grooves.
03.16 Measure the piston ring gap in cylinder bores.
03.17 Install piston pins according to manufacturer's specifications.
03.18 Check rod and piston assembly alignment.
03.19 Install rings on pistons.
03.20 Install piston rod assemblies.
03.21 Measure and check crankshafts with a micrometer.
03.22 Check needle bearings.
03.23 Inspect crankshafts and install seal.
03.24 Inspect, clean and/or replace reed valves.
03.25 Reassemble engines.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751030
Course Title: Marine Mechanics 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for maintaining and repairing electrical systems, cranking systems and ignition systems.

04.0 MAINTAIN AND REPAIR ELECTRICAL SYSTEMS--The student will be able to:

- 04.01 Set up and use voltmeters, ammeters and ohmmeters.
- 04.02 Locate and identify electrical circuit components.
- 04.03 Sketch a typical circuit using a single wire system.
- 04.04 Test storage batteries using a hydrometer.
- 04.05 Test storage batteries using a light and load test.
- 04.06 Charge storage batteries.
- 04.07 Remove and replace batteries and service battery boxes.
- 04.08 Repair damaged wire and electrical harnesses.
- 04.09 Diagnose circuit troubles using continuity or a test light and low reading voltmeters to record voltage drop.
- 04.10 Sketch and label typical fuel gage systems.
- 04.11 Remove and replace ammeters or indicating lights.
- 04.12 Remove and replace fuel gages.
- 04.13 Remove and replace fuel sending units.
- 04.14 Diagnose gages and accessory system troubles using test lights, voltmeters, ammeters or detached sending units.
- 04.15 Sketch typical circuits such as those for auto bilge pumps or navigation lights.
- 04.16 Locate opens, shorts and grounds.

05.0 MAINTAIN AND REPAIR CRANKING SYSTEMS--The student will be able to:

- 05.01 Disassemble recoil starters.
- 05.02 Inspect components of recoil starters.
- 05.03 Reassemble recoil starters.
- 05.04 Identify components of electrical starting systems.
- 05.05 Disassemble different types of starting motors.
- 05.06 Bench test armatures.
- 05.07 Bench test field coils.
- 05.08 Bench test drive units.
- 05.09 Bench test switches.
- 05.10 Bench test minor parts of starting motor components.
- 05.11 Use armature lathes for turning commutators.
- 05.12 Install, reassemble and test new starter parts.
- 05.13 Troubleshoot starting systems using battery starter testers.
- 05.14 Troubleshoot starting systems using voltmeters for finding excessive voltage drop.

05.15 Recondition solenoids, drives and other components.
05.16 Set up and use battery starter (load) testers.
05.17 Locate opens, shorts and grounds.

06.0 MAINTAIN AND REPAIR MAGNETO IGNITION SYSTEMS--The student will be able to:

06.01 Sketch and label electrical symbols.
06.02 Set up and use ohmmeters.
06.03 Set up and use voltmeters.
06.04 Set up and use ignition testers.
06.05 Set up and use ignition analyzers.
06.06 Locate and identify parts of magneto ignitions.
06.07 Locate and match electrical units by their symbols on a wiring diagram.
06.08 Sketch and label complete magneto ignition systems.
06.09 Check coil resistance with an ohmmeter.
06.10 Check points for continuity and resistance.
06.11 Check condensers for capacity, leaks and shorts.
06.12 Clean and regap spark plugs.

07.0 MAINTAIN AND REPAIR BATTERY IGNITION SYSTEMS--The student will be able to:

07.01 Locate and identify parts of battery ignition systems.
07.02 Locate and match electrical units by their symbols on a wiring diagram.
07.03 Sketch and label complete battery ignition systems.
07.04 Check coil resistance with an ohmmeter.
07.05 Check points for continuity and resistance.
07.06 Check condensers for capacity, leaks and shorts.
07.07 Set up and use test equipment.
07.08 Set timing using a timing light.

08.0 MAINTAIN AND REPAIR CAPACITOR DISCHARGE IGNITION SYSTEMS--The student will be able to:

08.01 Sketch and label electrical symbols.
08.02 Set up and use ohmmeters.
08.03 Set up and use a CD-77
08.04 Set up and use spark testers.
08.05 Set up and use neon test lights.
08.06 Set up and use low/high ammeters.
08.07 Set up and use voltmeters.
08.08 Locate and identify parts of capacitor discharge ignition systems.
08.09 Locate and match electrical units by their symbols on a wiring diagram.
08.10 Sketch and label complete C/D ignition systems.
08.11 Check coil resistance, shorts and grounds with an ohmmeter.
08.12 Check stator windings with an ohmmeter.
08.13 Check sensor coils, charge coils, ignition coils and shorts to ground with a CD-77.
08.14 Check power packs with an ohmmeter and a CD-77.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751040
Course Title: Marine Mechanics 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for maintaining and repairing outboard charging systems, fuel systems and cooling systems.

09.0 MAINTAIN AND REPAIR OUTBOARD CHARGING SYSTEMS--The student will be able to:

- 09.01 Sketch and label the units of complete charging circuits.
- 09.02 Disassemble charging systems and identify the components.
- 09.03 Perform stator and rectifier testing on charging systems.
- 09.04 Reassemble and test charging systems.
- 09.05 Set up and use ohmmeters.
- 09.06 Test regulators.
- 09.07 Reassemble and test complete units.

10.0 MAINTAIN AND REPAIR FUEL SYSTEMS---The student will be able to:

- 10.01 Identify and locate fuel system components (fuel tanks, lines, filters, etc.).
- 10.02 Sketch and label the parts of total fuel systems.
- 10.03 Service fuel lines.
- 10.04 Remove, clean and install fuel tanks.
- 10.05 Identify and locate fuel pump vacuums.
- 10.06 Remove, replace service and check the pressure of fuel pumps.
- 10.07 Remove, clean and replace in-line filters.
- 10.08 Identify the major types of carburetors.
- 10.09 Check and adjust throttle and governor linkages.

11.0 MAINTAIN AND REPAIR TWO-STROKE CYCLE CARBURETORS--The student will be able to:

- 11.01 Sketch and label the parts of total fuel systems.
- 11.02 Service fuel lines and primer bulbs (vacuum test).
- 11.03 Remove, clean, inspect and install fuel tanks.
- 11.04 Identify basic carburetor circuits (chokes, floats, fuel inlets; idle, intermediate and high speeds; mains, etc.)
- 11.05 Identify and locate fuel pumps.
- 11.06 Remove, inspect and replace fuel pumps.
- 11.07 Remove, clean, overhaul, replace and make final adjustments to carburetors.
- 11.08 Remove, service and replace air cleaners.
- 11.09 Diagnose carburetor problems.

11.10 Remove, inspect and replace reed valves and gaskets.
11.11 Diagnose exhaust problems such as back pressure and scavenging.
11.12 Inspect and service oil metering systems.
11.13 Determine and make appropriate fuel-oil mixtures.

12.0 MAINTAIN AND REPAIR INBOARD GAS SYSTEMS--The student will be able to:

12.01 Remove, service and replace carburetor air cleaners/flame arrestors.
12.02 Identify and locate fuel system components (fuel pumps, carburetors and air filters, linkages and intake manifolds).
12.03 Remove, clean, overhaul, replace and make final adjustments to carburetors.

13.0 MAINTAIN AND REPAIR COOLING SYSTEMS--The student will be able to:

13.01 Explain the principles of cooling systems, including fresh water cooling systems.
13.02 Trace water flow through cooling systems.
13.03 Disassemble and reassemble water pumps.
13.04 Remove, check and replace thermostats.
13.05 Use thermostat pressure relief systems.
13.06 Service manifolds, risers and thermostat housings.
13.07 Service water cooling systems for gas inboard, gas outboard and diesel engines.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751050
Course Title: Marine Mechanics 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for maintaining and repairing lubrication systems, outdrives, transmissions and intermediate housings, and the assembly and maintenance of outboard lower units and housing assemblies.

14.0 MAINTAIN AND REPAIR LUBRICATION SYSTEMS--The student will be able to:

- 14.01 Identify the types and functions of lubrication systems.
- 14.02 Explain the principles of lubrication systems.
- 14.03 Identify and locate components of lubrication systems.
- 14.04 Check engines for oil leaks.
- 14.05 Change engine oil and filters.
- 14.06 Check engine oil pressure and level.
- 14.07 Recognize and use only recommended oil.

15.0 MAINTAIN AND REPAIR INTERMEDIATE HOUSINGS--The student will be able to:

- 15.01 Disassemble main drive shafts.
- 15.02 Shim drive shafts to intermediate housings.
- 15.03 Remove and replace clutch assemblies.
- 15.04 Check electrical components with proper test equipment.
- 15.05 Remove and replace "U" joints.
- 15.06 Disassemble outer transom plates.
- 15.07 Adjust trim and limit switches.
- 15.08 Disassemble cylinder rams.

16.0 MAINTAIN AND REPAIR STERN DRIVE UPPER GEAR CASE--The student will be able to:

- 16.01 Determine the differences between mechanical, electrical and hydraulic shifting units.
- 16.02 Disassemble and reassemble each type of shifting unit.
- 16.03 Reshim units to manufacturers' specifications.
- 16.04 Use the proper oil to refill upper and lower gear cases.

17.0 PERFORM UPPER TO LOWER GEAR CASE MAINTENANCE--The student will be able to:

- 17.01 Disassemble exhaust housings.
- 17.02 Inspect seals, "O" rings, shafts and bearings.
- 17.03 Reassemble exhaust housings.

18.0 MAINTAIN AND REPAIR LOWER GEAR CASES--The student will be able to:

18.01 Determine the differences between mechanical, electrical and hydraulic shifting.
18.02 Remove and replace lower gear cases.
18.03 Reshim lower gear cases.
18.04 Refill lower gear cases with specified oil.
18.05 Determine propeller pitch, diameter and hub type.

19.0 MAINTAIN AND REPAIR TRANSMISSIONS--The student will be able to:

19.01 Inspect planetary clutch plate air coupling assemblies
19.02 Remove and replace transmissions.
19.03 Use proper service tools in shimming, reassembly and testing.
19.04 Drain transmissions.
19.05 Determine capacity using the transmission service manuals.
19.06 Refill transmissions according to manufacturers' specifications.

20.0 ASSEMBLE AND MAINTAIN OUTBOARD LOWER UNITS AND HOUSING ASSEMBLIES--The student will be able to:

20.01 Disassemble and reassemble steering handle groups.
20.02 Disassemble and assemble exhaust housings and water tube assemblies.
20.03 Replace motor mounts and shock absorbers.
20.04 Lubricate all fittings.
20.05 Pressure and vacuum test gear cases.
20.06 Remove and test cylinders and rams.
20.07 Adjust reverse locks.
20.08 Adjust the trim and tilt.
20.09 Determine the differences between mechanical, electrical and hydraulic shifting units.
20.10 Explain the shifting theory of the lower unit.
20.11 Disassemble and reassemble mechanical shifting units.
20.12 Disassemble and reassemble electrical shifting units.
20.13 Disassemble and reassemble hydraulic shifting units.
20.14 Inspect all parts for wear.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8751060
Course Title: Marine Mechanics 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for proper use of marine woods, metals and fiberglass, the adjustment, and repair of trailers, the proper way to prepare and deliver sales merchandise, and how to maintain and repair inboard diesel systems.

21.0 USE MARINE WOODS, METALS, AND FIBERGLASS--The student will be able to:

- 21.01 Explain the hazards of a marine environment to woods, metals and fiberglass.
- 21.02 Explain a galvanic series.
- 21.03 Explain the theory for using given materials in boat repair activities.

22.0 ADJUST AND REPAIR TRAILERS--The student will be able to:

- 22.01 Make boat to trailer adjustments.
- 22.02 Remove and replace lighting systems.
- 22.03 Remove and replace wheel bearings and springs.
- 22.04 Remove and replace brakes.
- 22.05 Disassemble, diagnose and reassemble trim and tilt systems.
- 22.06 Remove and test cylinder rams.
- 22.07 Adjust reverse locks.
- 22.08 Adjust the trim and tilt.

23.0 PREPARE AND DELIVER SALES MERCHANDISE--The student will be able to:

- 23.01 Make center line measurements for outboard motor installation.
- 23.02 Center the plate height.
- 23.03 Locate manufacturers' I.D. plates.
- 23.04 Mount control boxes at the helm.
- 23.05 Place wiring and cables in a neat and orderly manner.
- 23.06 Adjust the control cables from the engine to the control box.
- 23.07 Center the steering cable to the engine.
- 23.08 Find suitable locations for accessories and mount them to the boat.
- 23.09 Lubricate shafts, install propellers and fasten both securely.

23.10 Check for proper levels.
23.11 Check manufacturers' specifications.
23.12 Test-run boats.
23.13 Recheck work completed.
23.14 Check manufacturers' installation procedures for stern drive units.
23.15 Lubricate shafts and install propellers securely.
23.16 Obtain maximum oil level capacity.
23.17 Install or connect drain plugs, pet cocks, hose clamps, hoses, etc.
23.18 Find a suitable mount location and mount the engine securely in the boat.
23.19 Set engines to manufacturers' specifications.
23.20 Set, adjust and test engines to manufacturers' specifications.
23.21 Remove and replace running lights.
23.22 Troubleshoot lighting systems and accessories.
23.23 Check and adjust throttles, cables, horns, lights and tachometer

24.0 MAINTAIN AND REPAIR INBOARD/DIESEL SYSTEMS--The student will be able to:

24.01 Inspect, remove and replace alternator belts.
24.02 Check the output of charging systems.
24.03 Analyze malfunctions.
24.04 Test and overhaul alternators.
24.05 Remove and replace regulators.
24.06 Identify and locate fuel system components (fuel tanks, fuel lines, fuel pumps, air filters, governors and linkages and fuel injectors.)
24.07 Check fuel systems for leaks.
24.08 Bleed systems for starting.
24.09 Adjust nozzle pressure to manufacturer's specifications.
24.10 Set the injection pump angle (timing).
24.11 Check and adjust the throttle and governor linkage.
24.12 Check or replace glow plugs.
24.13 Check stop solenoids.

25.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

25.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
25.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
25.03 Read and follow written and oral instructions.
25.04 Answer and ask questions coherently and concisely.
25.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
25.06 Demonstrate appropriate telephone/communication skills.

26.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

26.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

26.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

26.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

26.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

26.05 Demonstrate an understanding of federal, state and local taxes and their computation.

27.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

27.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

27.02 Draw conclusions or make inferences from data.

27.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

27.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

29.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

29.01 Define entrepreneurship.

29.02 Describe the importance of entrepreneurship to the American economy.

29.03 List the advantages and disadvantages of business ownership.

29.04 Identify the risks involved in ownership of a business.

29.05 Identify the necessary personal characteristics of a successful entrepreneur.

29.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Marine Propulsion Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.080400
Grade Level	College Credits
Length	AS Degree/67
Certification	

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as machinery mechanics; marine engines (85116626), or marine mechanics/deck engineers (623.281-010). This program also provides supplemental training persons previously or currently employed in this occupation.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Marine Propulsion industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: installation and operation of diesel and gasoline engines; troubleshooting for diesel and gasoline engines; engine maintenance; propeller selection; corrosion control; and fiberglass hull repair.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student will receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The standard credit hour length for this program is 67 according to SBR 6A-14.030.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Perform basic shop practices.
02.0 Describe operational theory of (2) two and (4) four cycle engines - Diesel and Gasoline.
03.0 Use service manuals and parts references.
04.0 Perform basic welding skills.
05.0 Remove and install engines.
06.0 Recondition and service engines.
07.0 Perform diagnosis service and repairs to all types of marine ignition systems.
08.0 Develop skills in electrical-electronic theory of operation and application.
09.0 Troubleshoot and repair fuel systems.
10.0 Service cooling systems.
11.0 Service exhaust systems.
12.0 Demonstrate shop management functions.
13.0 Identify special marine principles.
14.0 Repair inboard drive systems.
15.0 Rig boats.
16.0 Repair lower units.
17.0 Perform corrosion experiments and understand corrosion control.
18.0 Apply fiberglass construction and maintenance procedures.
19.0 Demonstrate appropriate communication skills.
20.0 Demonstrate appropriate math skills.
21.0 Demonstrate appropriate understanding of basic science.
22.0 Demonstrate and practice employability skills.
23.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Marine Propulsion Technology
Secondary Number:
Postsecondary Number: 0615.080400

01.0 PERFORM BASIC SHOP PRACTICES--The student will be able to:

- 01.01 Perform calculations using decimals and fractions to include subtraction, multiplication and division.
- 01.02 Change fractions to decimals and decimals to fractions.
- 01.03 Determine metric system measurements.
- 01.04 Comply with safety rules and regulations.
- 01.05 Operate hand tools safely and properly.
- 01.06 Set up and use power tools safely and properly.
- 01.07 Set up and use precision measuring tools.
- 01.08 Drill and remove broken studs and install helicoils.
- 01.09 Identify threaded fasteners by size, type, thread series, thread classes, material hardness and compatibility.
- 01.10 Install fasteners such as screws, bolts and keys; and utilize screw extractor, thread cutting tape and dies.
- 01.11 Locate and match electrical units by their symbols on a wiring diagram.
- 01.12 Draw performance charts and graphs on propeller selection and engine specifications.

02.0 DESCRIBE OPERATIONAL THEORY OF (2) TWO AND (4) FOUR CYCLE ENGINES - DIESEL AND GASOLINE--The student will be able to:

- 02.01 Distinguish between the characteristics of four-stroke cycle engine including diesel engines.
- 02.02 Identify basic engine parts.
- 02.03 Describe the functions of the crankshaft.
- 02.04 List the information which may be found on the engine nameplate.
- 02.05 Describe types of motion and simple machines and characteristics of energy.
- 02.06 Calculate problems using the formula for work, horsepower and torque.
- 02.07 Describe the main theoretical concept of heat engines.
- 02.08 Describe the process by which an internal combustion engine converts chemical energy into rotary motion.
- 02.09 Calculate problems using the formulas for engine cubic displacement and compression ratio.
- 02.10 Describe the principles of operation of four-and two-stroke cycle engines.
- 02.11 Identify the parts of a camshaft lobe-crankshaft lobe.
- 02.12 Describe valve timing and overlap procedures.
- 02.13 Identify types of valve arrangements.
- 02.14 Identify types of engine construction.
- 02.15 Describe piston engine operation, design loop charged.

02.16 Describe the operation of two- and four-stroke cycle engines to include diesel engines.
02.17 Distinguish different engine design by manufacturers.
02.18 Identify marine engine makeup and conversion from auto engines.

03.0 USE SERVICE MANUALS AND PARTS REFERENCES--The student will be able to:

03.01 Demonstrate use of multiple and single type shop service manual.
03.02 Demonstrate use of specification handbooks and tune up charts.
03.03 Demonstrate use of manufacturer parts catalogs.
03.04 Demonstrate use of microfiche.
03.05 Demonstrate use of marine engine installation manuals.
03.06 Demonstrate use of flat rate and service bulletins.

04.0 PERFORM BASIC WELDING SKILLS--The student will be able to:

04.01 Set up and operate gas and electric various welding equipment.
04.02 Burn (cut) material using mechanized or hand-held gas torch equipment.
04.03 Prepare metal surfaces for welding.
04.04 Identify type of metal to be welded.
04.05 Braze metal frames and structures.
04.06 Fabricate metal frames and structures.
04.07 Pressure test weldment.
04.08 Perform plug weld technique.
04.09 Gas weld ferrous metals in all positions with or without filler rod.
04.10 Perform TIG welding in aluminum and stainless steel.
04.11 Use and maintain TIG welding equipment.
04.12 Perform MIG type welding on various metals.
04.13 Use welding principles to heat and remove broken screws and bolts.

05.0 REMOVE AND INSTALL ENGINES--The student will be able to:

05.01 Disconnect engine, mounts, wiring and lines.
05.02 Operate hydraulic engine hoist.
05.03 Mount engine mounts, wiring and lines.
05.04 Reconnect engine mounts, wiring and lines.
05.05 Cut openings for different engine installations.
05.06 Mount jet drive type of engine.
05.07 Align inboard (gas and diesel) engines to manufacturers' specifications.
05.08 Mount and align stern drive to housing using manufacturers' special tools and manuals.

06.0 RECONDITION AND SERVICE ENGINES--The student will be able to:

06.01 Remove and replace power head.

06.02 Disassemble engine.
06.03 Clean engine parts for inspection.
06.04 Inspect and check for proper condition.
06.05 Remove and replace oil pump.
06.06 Remove and replace fuel pump.
06.07 Service a multi-piece crankshaft.
06.08 Replace connecting rods and bearings.
06.09 Grind valves and time valves.
06.10 Inspect and grind power head.
06.11 Remove and replace flywheel.
06.12 Remove and replace exhaust manifolds.
06.13 Perform cylinder compression test.
06.14 Perform engine tune up.
06.15 Perform operational inspection of engine lubrication system.
06.16 Remove and service piston ring and pistons.
06.17 Fit piston pins.
06.18 Inspect crankshaft, camshaft, connecting rods and piston assembly.
06.19 Torque power head and lower unit to specifications.
06.20 Hone cylinders to manufacturers' specifications.

07.0 PERFORM DIAGNOSIS SERVICE AND REPAIRS FOR ALL TYPES OF MARINE IGNITION SYSTEMS--The student will be able to:

07.01 Diagnose, repair and replace malfunctions of ignition system components.
07.02 Set ignition timing.
07.03 Inspect secondary circuit lead wires, distributor and rotor measure resistance in secondary wires.
07.04 Inspect points and condensers of the primary circuit.
07.05 Overhaul distributors.
07.06 Analyze or adjust engine performance using engine analyzer devices.
07.07 Remove and replace spark plugs.
07.08 Adjust armature air gap.
07.09 Time the ignition system for O/B engines.
07.10 Use specialized test equipment.
07.11 Test CD type ignition systems.
07.12 Describe differences between marine and automotive type ignition components.
07.13 Observe safety practices in marine applications.
07.14 Read and interpret manufacturers wire diagrams.
07.15 Operate an engine dynamometer.

08.0 DEVELOP SKILLS IN ELECTRICAL-ELECTRONIC THEORY OF OPERATION AND APPLICATION--The student will be able to:

08.01 Apply Ohm's Law to series circuit.
08.02 Apply Ohm's Law to parallel circuits.
08.03 Apply Ohm's Law to series-parallel circuits.
08.04 Perform continuity test.
08.05 Diagnose and repair alternator.
08.06 Diagnose and repair or replace charging system regulator.

08.07 Service or replace battery cables and battery box.
08.08 Diagnose, repair or replace starter.
08.09 Diagnose and repair malfunctions in the cranking system.
08.10 Perform operational inspection of lighting system.
08.11 Measure voltage drops, current flow, resistance in a circuit or component with a multimeter.
08.12 Repair or replace switches to include ignition switches.
08.13 Repair or replace fuse block assembly.
08.14 Locate and repair shorts and open circuits in wiring.
08.15 Inspect and test windshield wiper motor, blades and arms.
08.16 Inspect or replace rectifier.
08.17 Replace diode assembly.
08.18 Remove, replace and repair electrical remote control assembly.
08.19 Service and install diesel and gasoline marine alarm systems.

09.0 TROUBLESHOOT AND REPAIR FUEL SYSTEMS--The student will be able to:

09.01 Identify fuel system components.
09.02 Explain operation of fuel system and components.
09.03 Repair carburetion.
09.04 Repair gasoline injection systems.
09.05 Replace fuel system components.
09.06 Identify fuel systems malfunction.
09.07 Replace fuel filter.
09.08 Repair fuel lines.
09.09 Adjust carburetor.
09.10 Service automatic or manual choke.
09.11 Service fuel pump.
09.12 Analyze for foreign particles in fuel system.
09.13 Correct fuel tank installation.
09.14 Test engines fuel flow using manufacturers' procedures and test equipment.
09.15 Identify fuel and oil specification for outboard motors, four-cycle engines and diesel applications.
09.16 Repair and test diesel fuel injector nozzles.
09.17 Repair and test diesel fuel pumps.
09.18 Replace and adjust unit type injector or marine diesel engines.
09.19 Correct procedure and timing of fuel injector pumps.
09.20 Conduct diesel fuel pressure test.
09.21 Correct rack adjustment on diesel engines.

10.0 SERVICE COOLING SYSTEMS--The student will be able to:

10.01 Check engine temperature.
10.02 Test thermostat.
10.03 Inspect and/or replace water pump.
10.04 Inspect and/or replace circulating water pump.
10.05 Pressure test cooling system.
10.06 Remove, clean and replace water cooling parts.
10.07 Inspect and repair heat exchanges on gasoline and marine diesel engine.

10.08 Inspect and repair marine keel coolers.
10.09 Identify different types of approved coolant used in marine closed cooling systems.
10.10 Check engine block cooling passages for corrosion and build-up.

11.0 SERVICE EXHAUST SYSTEMS--The student will be able to:

11.01 Remove, inspect and replace an exhaust housing.
11.02 Remove, inspect and replace inner exhaust housing.
11.03 Remove, inspect and replace seal.
11.04 Remove, inspect and replace aft exhaust cover.
11.05 Remove, inspect and replace rubber mount.
11.06 Remove, inspect and replace clamp.
11.07 Remove, inspect and replace mount cover.
11.08 Remove, inspect and replace water tube.
11.09 Inspect service turbo charger.
11.10 Recommend correct exhaust tubing for different marine applications.
11.11 Service marine water cooled exhaust systems.
11.12 Determine back pressure by under stator exhaust applications.

12.0 DEMONSTRATE SHOP MANAGEMENT FUNCTIONS--The student will be able to:

12.01 Process work orders.
12.02 Process merchandise return.
12.03 Select shop equipment and materials.
12.04 Supervise employees.
12.05 Develop work schedules.
12.06 Process warranty claims.
12.07 Perform business and computation skills.
12.08 Use inventory card files and select parts from stock.
12.09 Sell marine merchandise.
12.10 Process sales and service receipts.
12.11 Operate computer for inventory control.
12.12 Operate computer for service orders.
12.13 Program computers for new marine parts/merchandise received.
12.14 Place marine merchandise into correct/orderly inventory.
12.15 Complete correct order forms and perform both by computer program and written process.

13.0 IDENTIFY SPECIAL MARINE PRINCIPLES--The student will be able to:

13.01 Explain basic principles of thrust in marine applications.
13.02 Explain basic principles of propulsion in marine applications.
13.03 Explain correct propeller selection and performance.
13.04 Identify types of hulls used in marine applications.
13.05 Explain speed-length ratio and calculate hull speed and engine selection.

13.06 Identify bow angle and its effect on performance.
13.07 Perform dynamometer test on different engine horsepowers.
13.08 Perform test tank operations using manufacturer's test wheels.
13.09 Perform sea trials.
13.10 Identify transom heights and explain the effects on engine performance/speed/horsepower.

14.0 REPAIR INBOARD DRIVE SYSTEMS--The student will be able to:

14.01 Inspect gear housing assembly.
14.02 Determine fluid levels.
14.03 Adjust gear linkages.
14.04 Torque mounting bolts.
14.05 Inspect vacuum shift controls.
14.06 Inspect drive shaft.
14.07 Lubricate universal joint.
14.08 Inspect gimbal bearing.
14.09 Inspect constant velocity joint.
14.10 Measure drive shaft angle and runout.
14.11 Replace power transmission system.
14.12 Rebuild power transmission.
14.13 Correctly apply manufacturers' procedures in shimming and adjusting operations.

15.0 RIG BOATS--The student will be able to:

15.01 Install engine steering components.
15.02 Install and service electrical wiring harness.
15.03 Install and adjust trim tabs on outboard and stern drivers, both mechanical and hydraulic type.
15.04 Identify sea drive installation.
15.05 List methods of outboard motor transom bracket installation.
15.06 Describe and illustrate correct lighting/wiring procedures.
15.07 Install engine remote control by manufacturers specifications.

16.0 REPAIR LOWER UNITS--The student will be able to:

16.01 Lubricate lower unit.
16.02 Pressure and vacuum test lower unit.
16.03 Lubricate transom steering busing, cables, etc.
16.04 Inspect, clean and lubricate propeller shaft.
16.05 Inspect and install propeller.
16.06 Remove and replace magnets in lower unit.
16.07 Inspect, remove and replace vertical drive gear.
16.08 Remove, inspect and replace clutch dog.
16.09 Remove, inspect and replace clutch coils.
16.10 Remove, inspect and replace drive shaft pinion.
16.11 Remove, inspect and replace drive components.
16.12 Remove, inspect and replace lower unit seals.
16.13 Remove and replace swivel bracket.

16.14 Remove, inspect and replace forward and reverse driving gears.
16.15 Remove, inspect and replace drive shaft and components.
16.16 Remove, inspect and replace hydraulic pump, shaft rod end plunger.
16.17 Adjust trim tab.
16.18 Inspect and replace U-joints.
16.19 Inspect and repair or replace lower unit lock.
16.20 Remove, replace and repair tilt assemblies to include hydraulic tilt.
16.21 Correctly shim lower units to engine manufacturer's specifications.
16.22 Disassemble/reassemble stern drive gear cases.
16.23 Disassemble/inspect/service/reassemble inboard marine transmissions both gasoline and diesel.
16.24 Demonstrate the ability to analyze and solve problems, to do necessary research and to report the results in good form.
16.25 Develop individual responsibility for work done in the lab.
16.26 Develop an understanding and skill in testing and diagnosing marine engine service problems and to develop appreciation of the true value of testing equipment.
16.27 Calculate torque and gear ratio.
16.28 Compare and identify all types of gear arrangements.
16.29 Explain operation theory of mechanical shifting, electric shifting, and hydroelectric shifting.
16.30 Identify the major parts of these shifting mechanisms.
16.31 Understand by examination the principles of marine propulsion propeller theory.
16.32 Demonstrate an understanding of engine installation.
16.33 Apply knowledge to disassemble and assembly of all marine transmissions.
16.34 Handle lifting devices properly.
16.35 Diagnose planetary gear principle of operation and theory.

17.0 PERFORM CORROSION EXPERIMENTS AND UNDERSTAND CORROSION CONTROL--
The student will be able to:

17.01 Identify galvanic corrosion.
17.02 Explain the use and function of the galvanic series.
17.03 Understand corrosion and its prevention.
17.04 List chemical equation and symbols.
17.05 Demonstrate a basic knowledge of electricity.
17.06 Identify maintenance of boat hulls and when to determine its time.
17.07 Identify difference in corrosion and cavitation.
17.08 Demonstrate by lab experiments cause of corrosion.
17.09 List in test form, actual lab reports in the field.
17.10 Distinguish fatigue corrosion.
17.11 Understand electrolysis and its causes of corrosions.
17.12 Correctly prepare metals for protective coatings.
17.13 Identify protective coatings.

17.14 Practice safe lab experiences with dangerous chemicals.
17.15 Demonstrate theory of operation of impress currents.

17.16 Show proper installation procedure of impress current unit onboard ship.
17.17 Maintain records and diagnose impress current failure.
17.18 Write report analysis on corrosion in our environment.
17.19 Identify non-metallic corrosion.
17.20 Define special tools used in the maintenance and testing of sacrificial anodes.
17.21 Understand acrylic and styrene copolymer coating.
17.22 List causes of stray current corrosion.

18.0 APPLY FIBERGLASS CONSTRUCTION AND MAINTENANCE PROCEDURES--The student will be able to:

18.01 Describe safe handling procedures and care of fiberglass resins and materials.
18.02 Apply mixture methods of resins, coal tars, gel coat and paints.
18.03 Describe fiberglass boat manufacturing concept.s
18.04 Prepare a mold for casting a fiberglass hull.
18.05 Describe installation procedures of decks and gunwale.
18.06 Repair damaged fiberglass hulls.
18.07 Apply modern methods of maintaining new and old fiberglass hulls.
18.08 Demonstrate advance methods of boat building and the manufacturing of fiberglass accessories.

19.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

19.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
19.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
19.03 Read and follow written and oral instructions.
19.04 Answer and ask questions coherently and concisely.
19.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
19.06 Demonstrate appropriate telephone/communication skills.

20.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

20.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
20.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
20.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

20.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

20.05 Demonstrate an understanding of federal, state and local taxes and their computation.

21.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

21.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

21.02 Draw conclusions or make inferences from data.

21.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

21.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

22.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

22.01 Conduct a job search.

22.02 Secure information about a job.

22.03 Identify documents which may be required when applying for a job interview.

22.04 Complete a job application form correctly.

22.05 Demonstrate competence in job interview techniques.

22.06 Identify and adopt acceptable work habits.

22.07 Identify and adopt acceptable work habits.

22.08 Demonstrate knowledge of how to make appropriate job changes.

22.09 Demonstrate acceptable employee health habits.

22.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

23.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

23.01 Define entrepreneurship.

23.02 Describe the importance of entrepreneurship to the American economy.

23.03 List the advantages and disadvantages of business ownership.

23.04 Identify the risks involved in ownership of a business.

23.05 Identify the necessary personal characteristics of a successful entrepreneur.

23.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CLUSTER CURRICULUM FRAMEWORK

Cluster Title: Masonry
Cluster Type: Job Preparatory
Occupational Area: Industrial Education

Components Two Programs, One Core, Four Occupational Completion Points

	Secondary	PSAV
Grade Level	9-12, 30, 31	30, 31
Facility Code	203	203
VSO	VICA	VICA
Co-op Method	Yes	Yes
Apprenticeship	Yes	Yes

I. **PURPOSE:** The purpose of the programs in this cluster is to prepare students for employment or advanced training in the brick, block, and concrete masonry industry. The programs in this cluster also provide supplemental training for persons previously or currently employed in the masonry industry.

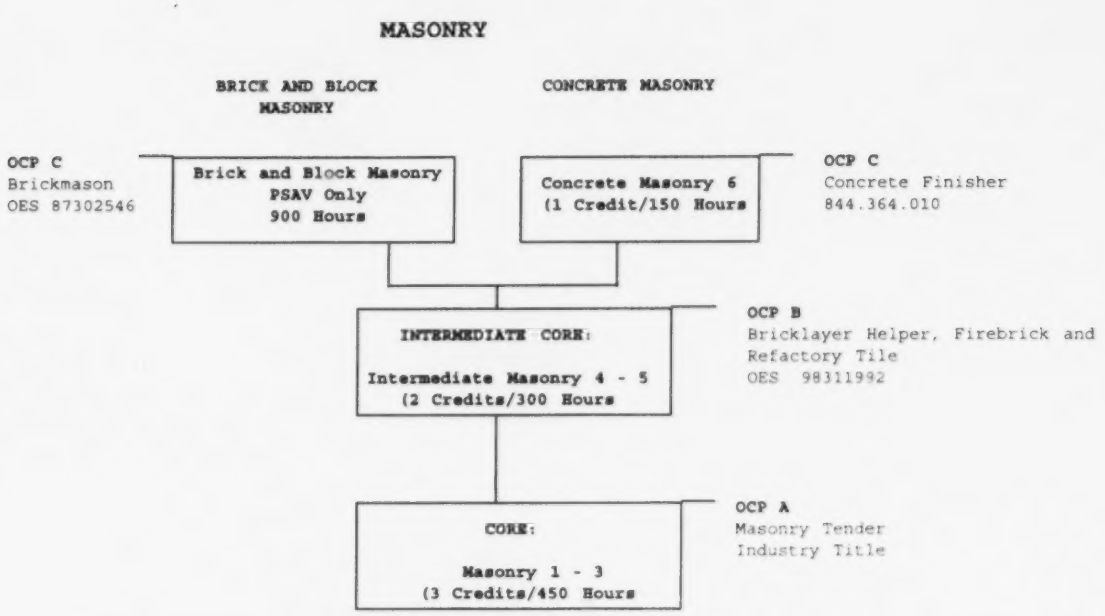
This cluster of programs focuses on broad, transferable skills, stresses the understanding of all aspects of the masonry industry, and demonstrates elements of the industry such as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

II. **CLUSTER STRUCTURE:** This cluster is a planned sequence of instruction consisting of two programs with one common core and four occupational completion points. The recommended sequence allows students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training program or terminate as an occupational completer.

It is recommended that students complete the core or demonstrate a mastery of the student performance standards contained in the core before advancing to the course(s) in the next level of either of the programs, Brick and Block Masonry or Concrete Masonry.

The Concrete Masonry program may be offered at both secondary and postsecondary adult vocational (PSAV) levels. For the Brick and Block Masonry program, Masonry 1 through 3 and Intermediate Masonry 4 and 5 may be offered at both secondary and PSAV levels, but Brick and Block Masonry courses are recommended for PSAV only.

The following diagram illustrates the cluster structure:



At the secondary level, this cluster of programs consists of the following courses, which include the core:

CONCRETE MASONRY PROGRAM - 6 secondary credits

CORE COURSES
8722610 - Masonry 1
8722620 - Masonry 2
8722630 - Masonry 3
8722640 - Intermediate Masonry 4
8722650 - Intermediate Masonry 5

ADVANCED COURSE
8722660 - Concrete Masonry 6

BRICK AND BLOCK MASONRY PROGRAM - 5 secondary credits

CORE COURSES
8722610 - Masonry 1
8722620 - Masonry 2
8722630 - Masonry 3
8722640 - Intermediate Masonry 4
8722650 - Intermediate Masonry 5

III. **LABORATORY ACTIVITIES**: Classroom, shop, and laboratory activities are an integral part of this cluster. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen

occupation. A generic equipment list for the programs in this cluster is available.

IV. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., (VICA) is the appropriate vocational student organization (VSO) for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The programs in this cluster may be offered in postsecondary adult vocational (PSAV) courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The cooperative method of instruction, on-the-job training (OJT), is appropriate for this program. Whenever the cooperative method is offered, the following are required for each student: (1) a training plan that is signed by the student, teacher, and employer and that includes instructional objectives and a list of on-the-job and in-school learning experiences and (2) a workstation that reflects the equipment, skills, and tasks relevant to the occupation that the student has chosen as a career goal. The student must be paid for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic-skills grade levels required for postsecondary adult vocational students to exit the programs in this cluster are listed before the intended outcomes for each program. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion of the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) or a remedial lab. Please refer to the Rule for exemptions.

When a secondary student with a disability is enrolled in a vocational class for which modifications to the curriculum framework have been made, the particular outcomes and student performance standards that the student must master to earn credit must be specified in the student's Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

SCANS Competencies: To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this cluster must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

Florida Department of Education
INTENDED OUTCOMES

Program Title: **Brick And Block Masonry Program**

	Secondary	PSAV
Program Number	**8722900**	**I463112**
CIP Number	0646.010203	0646.010203
Grade Level	9-12, 30, 31	30, 31
Length	5 Credits + 900 PSAV Hours	1650 Hours
Certification	TEC CONSTR ¶7 ¶G BLDG CONST ¶7 ¶G TROWEL TR @7 G	TEC CONSTR ¶7 ¶G BLDG CONST ¶7 ¶G TROWEL TR @7 G
Basic Skills		
Math		8
Language		7
Reading		7

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
MASONRY TENDER - Industry Title

01.0 Follow safety practices.
02.0 Characterize the masonry industry.
03.0 Identify and use hand tools.
04.0 Select and mix mortars and concrete.
05.0 Describe the properties, characteristics, and uses of brick.
06.0 Describe the properties, characteristics, and uses of concrete block.
07.0 Lay brick and/or block to the line.
08.0 Describe the various types and uses of bonding.
09.0 Identify the various methods of masonry practices.
10.0 Clean masonry.
11.0 Erect and disassemble basic scaffolds.
12.0 Apply appropriate communication and computer skills.
13.0 Apply appropriate math skills.
14.0 Demonstrate an understanding of the appropriate basic science.
15.0 Demonstrate positive customer-relations skills.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
BRICKLAYER HELPER, FIREBRICK AND REFRACTORY TILE - DOT Code 861.687-010

18.0 Read construction drawings and specifications.
19.0 Perform building layout.
20.0 Build foundations.
21.0 Estimate materials and cost.
22.0 Operate and maintain power equipment.

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OCCUPATIONAL COMPLETION POINT - DATA CODE C

BRICKMASON - DOT Code 861.381-018

23.0 Perform construction details.
24.0 Demonstrate productivity skills.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Brick And Block Masonry
Secondary Number: 8722900
Postsecondary Number: I463112

OCCUPATIONAL COMPLETION POINT - DATA CODE A
MASONRY TENDER - Industry

01.0 FOLLOW SAFETY PRACTICES--The student will be able to:

01.01 Identify and follow general safety rules.
01.02 Explain the purpose of the Occupational Safety and Health Administration (OSHA).
01.03 Describe first-aid procedures.
01.04 Follow safety practices when using tools and equipment.

02.0 CHARACTERIZE THE MASONRY INDUSTRY--The student will be able to:

02.01 Summarize the history of the masonry industry.
02.02 Explain the importance of the masonry industry to the local, state, and national economy.
02.03 Identify employment and advancement opportunities in the masonry industry.
02.04 Explain the factors involved in good-quality work.

03.0 IDENTIFY AND USE HAND TOOLS--The student will be able to:

03.01 Identify, care for, and use basic hand tools.
03.02 Select hand tools for specific jobs.
03.03 Identify power tools.
03.04 Read English rules to the 1/16".
03.05 Read brick-spacing rules and brick modular rules.

04.0 SELECT AND MIX MORTARS AND CONCRETE--The student will be able to:

04.01 Identify types of mortars.
04.02 Identify the ingredients and properties of mortars.
04.03 Identify the properties and characteristics of concrete.
04.04 Identify colored mortars (admix and factory-blended).
04.05 Identify the types and purposes of grouts.
04.06 Store and place materials.
04.07 Select mortars and concrete.
04.08 Mix mortars by hand and by machine.
04.09 Mix concrete by hand and by machine.
04.10 Clean up tools, equipment, and the work site.

05.0 DESCRIBE THE PROPERTIES, CHARACTERISTICS, AND USES OF BRICK--The student will be able to:

05.01 Explain the brick-manufacturing process.

05.02 Identify the properties and characteristics of brick.
05.03 Distinguish between standard and modular bricks.
05.04 Describe the different types of bricks and their principal uses.
05.05 Identify brick positioning in a wall.

06.0 DESCRIBE THE PROPERTIES, CHARACTERISTICS, AND USES OF CONCRETE BLOCK--The student will be able to:

06.01 Explain the manufacturing process of concrete block.
06.02 Identify the properties and characteristics of concrete block.
06.03 Describe the different types, including shapes and sizes, of concrete blocks and their principal uses.

07.0 LAY BRICK AND/OR BLOCK TO THE LINE--The student will be able to:

07.01 Spread mortar for brick and/or block.
07.02 Butter head joints.
07.03 Set up masonry materials.
07.04 Pull a line.
07.05 Cut bricks and/or blocks with a hammer, a brick set, and a trowel.
07.06 Temper mortar.
07.07 Maintain proper spacing of head and bed joints.
07.08 Point and tool joints in brick and/or block walls.
07.09 Lay brick and/or block to the line.

08.0 DESCRIBE THE VARIOUS TYPES AND USES OF BONDING--The student will be able to:

08.01 Define and describe pattern, structural, and adhesive bonding.
08.02 Differentiate among and use stretcher, common, English, English cross, Flemish, and stack bonds.

09.0 IDENTIFY THE VARIOUS METHODS OF MASONRY PRACTICES--The student will be able to:

09.01 Identify the methods of basic building layouts.
09.02 Identify the methods of digging and pouring footings.
09.03 Identify the methods of forming, grading, and pouring concrete slabs.
09.04 Identify the different types of reinforced masonry, flashing, wall reinforcement, and ties.
09.05 Identify measuring tools.
09.06 Identify power equipment.

10.0 CLEAN MASONRY--The student will be able to:

10.01 Follow safety practices when cleaning masonry.
10.02 Identify reasons for cleaning.
10.03 Identify and select cleaning materials and equipment.
10.04 Prepare cleaning solutions.
10.05 Point new and old work.
10.06 Prepare the area.
10.07 Clean the wall, using different methods.

11.0 ERECT AND DISASSEMBLE BASIC SCAFFOLDS--The student will be able to:

- 11.01 Follow safety practices when working with ladders and scaffolds.
- 11.02 Erect and disassemble basic scaffolds.

12.0 APPLY APPROPRIATE COMMUNICATION AND COMPUTER SKILLS--The student will be able to:

- 12.01 Ask and answer questions coherently and concisely.
- 12.02 Read and follow written instructions and listen to and follow oral instructions.
- 12.03 Make oral presentations.
- 12.04 Write reports using word-processing software.
- 12.05 Read and interpret industry-related materials.
- 12.06 Find information in technical literature such as a manufacturer's manual.
- 12.07 Read and interpret the graphs, charts, diagrams, and tables commonly used in the industry.
- 12.08 Fill out the forms and invoices commonly used in the industry.
- 12.09 Demonstrate appropriate telephone communication skills.
- 12.10 Use industry-related computer software.

13.0 APPLY APPROPRIATE MATH SKILLS--The student will be able to:

- 13.01 Solve job-related problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
- 13.02 Solve job-related problems for ratios and proportions.
- 13.03 Determine the purchase price of items, including the sales tax.
- 13.04 Compute federal, state, and local taxes.

14.0 DEMONSTRATE AN UNDERSTANDING OF THE APPROPRIATE BASIC SCIENCE--The student will be able to:

- 14.01 Explain molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 14.02 Explain pressure measurement in terms of pounds per square inch (PSI) and inches of mercury.
- 14.03 Draw conclusions or make inferences from data.
- 14.04 Identify health-related problems caused by exposure to work-related chemicals and hazardous materials.
- 14.05 Describe the proper precautions for handling work-related chemicals and hazardous materials.

15.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

- 15.01 Exercise self-control.
- 15.02 Identify and demonstrate appropriate responses to criticism.
- 15.03 Explain the effects of positive human-relations skills on success in the business.
- 15.04 Demonstrate respect for people and property.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search and identify advanced-training opportunities.
16.02 Secure information about a job.
16.03 Identify documents that may be required for a job application.
16.04 Complete a job-application form.
16.05 Demonstrate competence in job-interview techniques.
16.06 Demonstrate productive work habits and positive attitudes.
16.07 Demonstrate a knowledge of how to make job changes appropriately.
16.08 Demonstrate ethical and responsible practices.
16.09 Demonstrate acceptable personal-hygiene habits and a professional appearance.
16.10 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
16.11 Explain the importance of taking pride in the quality of work performed.
16.12 Describe the importance of a drug-free workplace and industry policies toward drug use.
16.13 Describe the ramifications of a poor driving record on employment opportunities.
16.14 Describe Florida's "Right-to-Know" Law as recorded in the Florida Statutes, Chapter 442.
16.15 Explain the importance of confidentiality in the workplace.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define "entrepreneurship."
17.02 Describe the importance of entrepreneurship to the American economy and the role of small business in the free-enterprise system.
17.03 Explain the advantages and disadvantages of business ownership.
17.04 Explain the risks involved in the ownership of a business.
17.05 Identify the necessary personal characteristics of a successful entrepreneur.
17.06 Identify the business skills needed to operate a small business efficiently and effectively.
17.07 Describe the employer's responsibilities to support the business and industry.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
BRICKLAYER HELPER, FIREBRICK AND REFRACTORY TILE - DOT Code 861.687-010

18.0 READ CONSTRUCTION DRAWINGS AND SPECIFICATIONS--The student will be able to:

18.01 Identify types of drawings.
18.02 Identify symbols on the drawings.
18.03 Read and interpret simple drawings.
18.04 Read and interpret specifications.

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18.05 Explain the importance of following local, state, and national codes and standards.
18.06 Interpret a finished schedule.
18.07 Use an architect's scale.

19.0 PERFORM BUILDING LAYOUT--The student will be able to:

19.01 Read and interpret plot plans.
19.02 Establish building corners.
19.03 Build batter boards and establish building lines and elevations.
19.04 Dig, prepare, and pour footings to local codes and standards.

20.0 BUILD FOUNDATIONS--The student will be able to:

20.01 Establish and build corner leads.
20.02 Build foundation walls to floor elevations.
20.03 Make foundation walls waterproof.
20.04 Install flashing, anchor bolts, termite shields, and weep holes.

21.0 ESTIMATE MATERIALS AND COST--The student will be able to:

21.01 Estimate the materials needed for a specific job.
21.02 Estimate the cost of the materials, including the sales tax.

22.0 OPERATE AND MAINTAIN POWER EQUIPMENT--The student will be able to:

22.01 Follow safety practices when using and maintaining power equipment.
22.02 Use a masonry saw with an abrasive blade to cut masonry units.
22.03 Use a masonry saw with a diamond blade to cut masonry units.
22.04 Set up, operate, and maintain power tools and equipment.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
BRICKMASON - OES 87302546

23.0 SELECT, USE, AND MAINTAIN HAND AND POWER TOOLS--The student will be able to:

23.01 Select, use, and maintain the hand tools required for concrete masonry jobs.
23.02 Select, use, and maintain the power tools required for concrete masonry jobs.

24.0 PREPARE A SITE FOR CONCRETE POURING--The student will be able to:

24.01 Excavate and grade the site.
24.02 Erect forms.
24.03 Install a vapor barrier.
24.04 Install reinforcement and expansion materials.
24.05 Install and grade stakes.

25.0 POUR AND FINISH A CONCRETE SLAB--The stuudent will be able to:

25.01 Pour, place, and vibrate (if neccessary) concrete.
25.02 Screed to grade.
25.03 Finish concrete.
25.04 Saw control joints, if necessaryy.
25.05 Protect the slab.
25.06 Clean up tools, equipment, and wwork area.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722610
Course Title: Masonry 1
Course Credit: 1

COURSE DESCRIPTION:

This course provides students with the competencies essential to the masonry industry. These competencies include knowledge and skills related to safety practices, the masonry industry in America, the use of hand tools, the selection and mixing of mortars and concrete, and brick and block laying.

01.0 FOLLOW SAFETY PRACTICES--The student will be able to:

- 01.01 Identify and follow general safety rules.
- 01.02 Explain the purpose of the Occupational Safety and Health Administration (OSHA).
- 01.03 Describe first-aid procedures.
- 01.04 Follow safety practices when using tools and equipment.

02.0 CHARACTERIZE THE MASONRY INDUSTRY--The student will be able to:

- 02.01 Summarize the history of the masonry industry.
- 02.02 Explain the importance of the masonry industry to the local, state, and national economy.
- 02.03 Identify employment and advancement opportunities in the masonry industry.
- 02.04 Explain the factors involved in good-quality work.

03.0 IDENTIFY AND USE HAND TOOLS--The student will be able to:

- 03.01 Identify, care for, and use basic hand tools.
- 03.02 Select hand tools for specific jobs.
- 03.03 Identify power tools.
- 03.04 Read English rules to the 1/16".
- 03.05 Read brick-spacing rules and brick modular rules.
- 03.06 Course brick to a given height with the brick spacing rule and the modular rule.

04.0 SELECT AND MIX MORTARS AND CONCRETE--The student will be able to:

- 04.01 Identify types of mortars.
- 04.02 Identify the ingredients and properties of mortars.
- 04.03 Identify the properties and characteristics of concrete.
- 04.04 Identify colored mortars (admix and factory-blended).
- 04.05 Identify the types and purposes of grouts.
- 04.06 Store and place materials.
- 04.07 Select mortars and concrete.
- 04.08 Mix mortars by hand and by machine.
- 04.09 Mix concrete by hand and by machine.

04.10 Clean up tools, equipment, and the work site.
04.11 Build a brick 4" corner return lead.

07.0 LAY BRICK AND/OR BLOCK TO THE LINE--The student will be able to:

07.01 Set up masonry materials.
07.02 Temper mortar.
07.03 Spread mortar for brick.
07.04 Pull a line from established leads.
07.05 Butter head joints.
07.06 Lay brick to the line.
07.07 Maintain proper spacing of head and bed joints.
07.08 Cut brick with a hammer, a brick set, and a trowel.
07.09 Point and tool joints in brick walls.
07.10 Repeat the above nine tasks (07.01 - 07.09) with 8" concrete block.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722620
Course Title: Masonry 2
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies necessary to the masonry industry. These competencies include knowledge and skills related to the properties, characteristics, and uses of brick and concrete block; bonding; methods of masonry practices; masonry cleaning; scaffolding; communication; and computer use.

05.0 DESCRIBE THE PROPERTIES, CHARACTERISTICS, AND USES OF BRICK--The student will be able to:

- 05.01 Explain the brick-manufacturing process.
- 05.02 Identify the properties and characteristics of brick.
- 05.03 Distinguish between standard and modular bricks.
- 05.04 Describe the different types of bricks and their principal uses.
- 05.05 Identify brick positioning in a wall.
- 05.06 Build 4" corner return leads and a wall 4 feet high and 12 feet long.

06.0 DESCRIBE THE PROPERTIES, CHARACTERISTICS, AND USES OF CONCRETE BLOCK--The student will be able to:

- 06.01 Explain the manufacturing process of concrete block.
- 06.02 Identify the properties and characteristics of concrete block.
- 06.03 Describe the different types, including shapes and sizes, of concrete blocks and their principal uses.
- 06.04 Build an 8" block corner return lead 7 courses high.

08.0 DESCRIBE THE VARIOUS TYPES AND USES OF BONDING--The student will be able to:

- 08.01 Define and describe pattern, structural, layout, and adhesive bonding.
- 08.02 Differentiate among and use stretcher, common, English, English cross, Flemish, and stack bonds.

09.0 IDENTIFY THE VARIOUS METHODS OF MASONRY PRACTICES--The student will be able to:

- 09.01 Identify the methods of basic building layouts.
- 09.02 Identify the methods of digging and pouring footings.
- 09.03 Identify the methods of forming, grading, and pouring concrete slabs.

09.04 Identify the different types of reinforced masonry, flashing, wall reinforcement, and ties.
09.05 Identify measuring tools.
09.06 Identify power equipment.

10.0 CLEAN MASONRY--The student will be able to:

10.01 Follow safety practices when cleaning masonry.
10.02 Identify reasons for cleaning.
10.03 Identify and select cleaning materials and equipment for brick and concrete block.
10.04 Prepare cleaning solutions.
10.05 Point new and old work.
10.06 Prepare the area.
10.07 Clean the wall, using different methods.

11.0 ERECT AND DISASSEMBLE BASIC SCAFFOLDS--The student will be able to:

11.01 Follow safety practices when working with ladders and scaffolds.
11.02 Erect and disassemble basic scaffolds.

12.0 APPLY APPROPRIATE COMMUNICATION AND COMPUTER SKILLS--The student will be able to:

12.01 Ask and answer questions coherently and concisely.
12.02 Read and follow written instructions and listen to and follow oral instructions.
12.03 Make oral presentations.
12.04 Write reports using word-processing software.
12.05 Read and interpret industry-related materials.
12.06 Find information in technical literature such as a manufacturer's manual.
12.07 Read and interpret the graphs, charts, diagrams, and tables commonly used in the industry.
12.08 Fill out the forms and invoices commonly used in the industry.
12.09 Demonstrate appropriate telephone communication skills.
12.10 Use industry-related computer software.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722630
Course Title: Masonry 3
Course Credit: 1

COURSE DESCRIPTION:

This course provides students with competencies in math, basic science, customer relations, employability, and entrepreneurship.

13.0 APPLY APPROPRIATE MATH SKILLS--The student will be able to:

- 13.01 Solve job-related problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
- 13.02 Solve job-related problems for ratios and proportions.
- 13.03 Determine the purchase price of items, including the sales tax.
- 13.04 Compute federal, state, and local taxes.

14.0 DEMONSTRATE AN UNDERSTANDING OF THE APPROPRIATE BASIC SCIENCE--The student will be able to:

- 14.01 Explain molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 14.02 Explain pressure measurement in terms of pounds per square inch (PSI) and inches of mercury.
- 14.03 Draw conclusions or make inferences from data.
- 14.04 Identify health-related problems caused by exposure to work-related chemicals and hazardous materials.
- 14.05 Describe the proper precautions for handling work-related chemicals and hazardous materials.

15.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

- 15.01 Exercise self-control.
- 15.02 Identify and demonstrate appropriate responses to criticism.
- 15.03 Explain the effects of positive human-relations skills on success in the business.
- 15.04 Demonstrate respect for people and property.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 16.01 Conduct a job search and identify advanced-training opportunities.
- 16.02 Secure information about a job.
- 16.03 Identify documents that may be required for a job application.
- 16.04 Complete a job-application form.
- 16.05 Demonstrate competence in job-interview techniques.
- 16.06 Demonstrate productive work habits and positive attitudes.

16.07 Demonstrate a knowledge of how to make job changes appropriately.

16.08 Demonstrate ethical and responsible practices.

16.09 Demonstrate acceptable personal-hygiene habits and a professional appearance.

16.10 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.

16.11 Explain the importance of taking pride in the quality of work performed.

16.12 Describe the importance of a drug-free workplace and industry policies toward drug use.

16.13 Describe the ramifications of a poor driving record on employment opportunities.

16.14 Describe "Florida's Right-to-Know" Law as recorded in the Florida Statutes, Chapter 442.

16.15 Explain the importance of confidentiality in the workplace.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define "entrepreneurship."

17.02 Describe the importance of entrepreneurship to the American economy and the role of small business in the free-enterprise system.

17.03 Explain the advantages and disadvantages of business ownership.

17.04 Explain the risks involved in the ownership of a business.

17.05 Identify the necessary personal characteristics of a successful entrepreneur.

17.06 Identify the business skills needed to operate a small business efficiently and effectively.

17.07 Describe the employer's responsibilities to support the business and industry.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722640
Course Title: Intermediate Masonry 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with competencies in construction drawings and specifications and in building layout.

18.0 READ CONSTRUCTION DRAWINGS AND SPECIFICATIONS--The student will be able to:

- 18.01 Identify types of drawings.
- 18.02 Identify symbols on the drawings.
- 18.03 Read and interpret simple drawings.
- 18.04 Read and interpret specifications.
- 18.05 Explain the importance of following local, state, and national codes and standards.
- 18.06 Interpret a finished schedule.
- 18.07 Use an architect's scale.

19.0 PERFORM BUILDING LAYOUT--The student will be able to:

- 19.01 Read and interpret plot plans.
- 19.02 Establish building corners.
- 19.03 Build batter boards and establish building lines and elevations.
- 19.04 Dig, prepare, and pour footings to local codes and standards.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722650
Course Title: Intermediate Masonry 5
Course Credit: 1

COURSE DESCRIPTION:

This course provides students with an in-depth study of foundation building, materials and cost estimations, and power-equipment operation.

20.0 BUILD FOUNDATIONS--The student will be able to:

- 20.01 Build an 8" block corner 7 courses high.
- 20.02 Build an 8" block corner to the correct height and range of a given foundation batter board line.
- 20.03 Bond and build an 8" block corner to the correct height and range on the opposite corner of a given foundation batter board line.
- 20.04 Pull a line and build an 8" block wall between the block corners.
- 20.05 Establish and build the other corner leads.
- 20.06 Build foundation walls to floor elevations.
- 20.07 Make foundation walls waterproof, if required.
- 20.08 Install flashing, anchor bolts, termite shields, and weep holes; install vents if a wooden floor system is used.

21.0 ESTIMATE MATERIALS AND COST--The student will be able to:

- 21.01 Estimate the materials needed for a specific job.
- 21.02 Estimate the cost of the materials, including the sales tax.

22.0 OPERATE AND MAINTAIN POWER EQUIPMENT--The student will be able to:

- 22.01 Follow safety practices when using and maintaining power equipment.
- 22.02 Use a masonry saw with an abrasive blade to cut masonry units.
- 22.03 Use a masonry saw with a diamond blade to cut masonry units.
- 22.04 Set up, operate, and maintain power tools and equipment.

July 1997

Florida Department of Education
INTENDED OUTCOMES

Program Title: **Concrete Masonry Program**

	Secondary	PSAV
Program Number	**8722600**	**I463113**
CIP Number	0646.010204	0646.010204
Grade Level	9-12, 30, 31	30, 31
Length	6 Credits	900 Hours
Certification	TEC CONSTR ¶7 ¶G	TEC CONSTR ¶7 ¶G
	BLDG CONST ¶7 ¶G	BLDG CONST ¶7 ¶G
	TROWEL TR @7 G	TROWEL TR @7 G
Basic-Skills Grade Level		
	Math	8
	Language	7
	Reading	7

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
MASONRY TENDER - Industry Title

01.0 Follow safety practices.
02.0 Characterize the masonry industry.
03.0 Identify and use hand tools.
04.0 Select and mix mortars and concrete.
05.0 Describe the properties, characteristics, and uses of brick.
06.0 Describe the properties, characteristics, and uses of concrete block.
07.0 Lay brick and/or block to the line.
08.0 Describe the various types and uses of bonding.
09.0 Identify the various methods of masonry practices.
10.0 Clean masonry.
11.0 Erect and disassemble basic scaffolds.
12.0 Apply appropriate communication and computer skills.
13.0 Apply appropriate math skills.
14.0 Demonstrate an understanding of the appropriate basic science.
15.0 Demonstrate positive customer-relations skills.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
BRICKLAYER HELPER, FIREBRICK AND REFRACTORY TILE -
DOT Code 861.687-010

18.0 Read construction drawings and specifications.
19.0 Perform building layout.
20.0 Build foundations.
21.0 Estimate materials and cost.
22.0 Operate and maintain power equipment.

OCCUPATIONAL COMPLETION POINT - DATA CODE C

CONCRETE FINISHER - 844.364-010

23.0 Select, use, and maintain hand and power tools.
24.0 Prepare a site for concrete pouring.
25.0 Pour and finish a concrete slab.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Concrete Masonry
Secondary Number: 8722600
Postsecondary Number: I463113

OCCUPATIONAL COMPLETION POINT - DATA CODE A
MASONRY TENDER - Industry Title

01.0 FOLLOW SAFETY PRACTICES--The student will be able to:

- 01.01 Identify and follow general safety rules.
- 01.02 Explain the purpose of the Occupational Safety and Health Administration (OSHA).
- 01.03 Describe first-aid procedures.
- 01.04 Follow safety practices when using tools and equipment.

02.0 CHARACTERIZE THE MASONRY INDUSTRY--The student will be able to:

- 02.01 Summarize the history of the masonry industry.
- 02.02 Explain the importance of the masonry industry to the local, state, and national economy.
- 02.03 Identify employment and advancement opportunities in the masonry industry.
- 02.04 Explain the factors involved in good-quality work.

03.0 IDENTIFY AND USE HAND TOOLS--The student will be able to:

- 03.01 Identify, care for, and use basic hand tools.
- 03.02 Select hand tools for specific jobs.
- 03.03 Identify power tools.
- 03.04 Read English rules to the 1/16".
- 03.05 Read brick-spacing rules and brick modular rules.

04.0 SELECT AND MIX MORTARS AND CONCRETE--The student will be able to:

- 04.01 Identify types of mortars.
- 04.02 Identify the ingredients and properties of mortars.
- 04.03 Identify the properties and characteristics of concrete.
- 04.04 Identify colored mortars (admix and factory-blended).
- 04.05 Identify the types and purposes of grouts.
- 04.06 Store and place materials.
- 04.07 Select mortars and concrete.
- 04.08 Mix mortars by hand and by machine.
- 04.09 Mix concrete by hand and by machine.
- 04.10 Clean up tools, equipment, and the work site.

05.0 DESCRIBE THE PROPERTIES, CHARACTERISTICS, AND USES OF BRICK--The student will be able to:

- 05.01 Explain the brick-manufacturing process.
- 05.02 Identify the properties and characteristics of brick.

05.03 Distinguish between standard and modular bricks.
05.04 Describe the different types of bricks and their principal uses.
05.05 Identify brick positioning in a wall.

06.0 DESCRIBE THE PROPERTIES, CHARACTERISTICS, AND USES OF CONCRETE BLOCK--The student will be able to:

06.01 Explain the manufacturing process of concrete block.
06.02 Identify the properties and characteristics of concrete block.
06.03 Describe the different types, including shapes and sizes, of concrete blocks and their principal uses.

07.0 LAY BRICK AND/OR BLOCK TO THE LINE--The student will be able to:

07.01 Spread mortar for brick and/or block.
07.02 Butter head joints.
07.03 Set up masonry materials.
07.04 Pull a line.
07.05 Cut bricks and/or blocks with a hammer, a brick set, and a trowel.
07.06 Temper mortar.
07.07 Maintain proper spacing of head and bed joints.
07.08 Point and tool joints in brick and/or block walls.
07.09 Lay brick and/or block to the line.

08.0 DESCRIBE THE VARIOUS TYPES AND USES OF BONDING--The student will be able to:

08.01 Define and describe pattern, structural, and adhesive bonding.
08.02 Differentiate among and use stretcher, common, English, English cross, Flemish, and stack bonds.

09.0 IDENTIFY THE VARIOUS METHODS OF MASONRY PRACTICES--The student will be able to:

09.01 Identify the methods of basic building layouts.
09.02 Identify the methods of digging and pouring footings.
09.03 Identify the methods of forming, grading, and pouring concrete slabs.
09.04 Identify the different types of reinforced masonry, flashing, wall reinforcement, and ties.
09.05 Identify measuring tools.
09.06 Identify power equipment.

10.0 CLEAN MASONRY--The student will be able to:

10.01 Follow safety practices when cleaning masonry.
10.02 Identify reasons for cleaning.
10.03 Identify and select cleaning materials and equipment.
10.04 Prepare cleaning solutions.
10.05 Point new and old work.
10.06 Prepare the area.
10.07 Clean the wall, using different methods.

11.0 ERECT AND DISASSEMBLE BASIC SCAFFOLDS--The student will be able to:

- 11.01 Follow safety practices when working with ladders and scaffolds.
- 11.02 Erect and disassemble basic scaffolds.

12.0 APPLY APPROPRIATE COMMUNICATION AND COMPUTER SKILLS--The student will be able to:

- 12.01 Ask and answer questions coherently and concisely.
- 12.02 Read and follow written instructions and listen to and follow oral instructions.
- 12.03 Make oral presentations.
- 12.04 Write reports using word-processing software.
- 12.05 Read and interpret industry-related materials.
- 12.06 Find information in technical literature such as a manufacturer's manual.
- 12.07 Read and interpret the graphs, charts, diagrams, and tables commonly used in the industry.
- 12.08 Fill out the forms and invoices commonly used in the industry.
- 12.09 Demonstrate appropriate telephone communication skills.
- 12.10 Use industry-related computer software.

13.0 APPLY APPROPRIATE MATH SKILLS--The student will be able to:

- 13.01 Solve job-related problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
- 13.02 Solve job-related problems for ratios and proportions.
- 13.03 Determine the purchase price of items, including the sales tax.
- 13.04 Compute federal, state, and local taxes.

14.0 DEMONSTRATE AN UNDERSTANDING OF THE APPROPRIATE BASIC SCIENCE--The student will be able to:

- 14.01 Explain molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 14.02 Explain pressure measurement in terms of pounds per square inch (PSI) and inches of mercury.
- 14.03 Draw conclusions or make inferences from data.
- 14.04 Identify health-related problems caused by exposure to work-related chemicals and hazardous materials.
- 14.05 Describe proper precautions for handling work-related chemicals and hazardous materials.

15.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

- 15.01 Exercise self-control.
- 15.02 Identify and demonstrate appropriate responses to criticism.
- 15.03 Explain the effects of positive human-relations skills on success in the business.
- 15.04 Demonstrate respect for people and property.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The stutudent will be able to:

16.01 Conduct a job search and identifyfy advanced-training opportunities.
16.02 Secure information about a job.
16.03 Identify documents that may be rerequired for a job application.
16.04 Complete a job-application form..
16.05 Demonstrate competence in job-intnterview techniques.
16.06 Demonstrate productive work habitits and positive attitudes.
16.07 Demonstrate a knowledge of how tcto make job changes appropriately.
16.08 Demonstrate ethical and responsiiible practices.
16.09 Demonstrate acceptable personal-h-hygiene habits and a professional appearance.
16.10 Apply the principles of time mananagement, work simplification, and teamwork when performing assisigned tasks.
16.11 Explain the importance of taking g pride in the quality of work performed.
16.12 Describe the importance of a drugug-free workplace and industry policies toward drug use.
16.13 Describe the ramifications of a p poor driving record on employment opportunities.
16.14 Describe "Florida's Right-to-Knowow" Law as recorded in the Florida Statutes, Chapter 442.
16.15 Explain the importance of confidedentiality in the workplace.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define "entrepreneurship."
17.02 Describe the importance of entrepepreneurship to the American economy and the role of small bususiness in the free-enterprise system.
17.03 Explain the advantages and disadvdvantages of business ownership.
17.04 Explain the risks involved in thene ownership of a business.
17.05 Identify the personal characterististics of a successful entrepreneur.
17.06 Identify the business skills neededed to operate a small business efficiently and effectively.
17.07 Describe the employer's responsibibilities to support the business and industry.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
BRICKLAYER HELPER, FIREBRICK AND REFRACTORORY TILE - DOT Code 861.687-010

18.0 READ CONSTRUCTION DRAWINGS AND SPECIFICATITIONS--The student will be able to:

18.01 Identify types of drawings.
18.02 Identify symbols on the drawings..
18.03 Read and interpret simple drawingsgs.
18.04 Read and interpret specifications.s.

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18.05 Explain the importance of following local, state, and national codes and standards.
18.06 Interpret a finished schedule.
18.07 Use an architect's scale.

19.0 PERFORM BUILDING LAYOUT--The student will be able to:

19.01 Read and interpret plot plans.
19.02 Establish building corners.
19.03 Build batter boards and establish building lines and elevations.
19.04 Dig, prepare, and pour footings to local codes and standards.

20.0 BUILD FOUNDATIONS--The student will be able to:

20.01 Establish and build corner leads.
20.02 Build foundation walls to floor elevations.
20.03 Make foundation walls waterproof.
20.04 Install flashing, anchor bolts, termite shields, and weep holes.

21.0 ESTIMATE MATERIALS AND COST--The student will be able to:

21.01 Estimate the materials needed for a specific job.
21.02 Estimate the cost of the materials, including the sales tax.

22.0 OPERATE AND MAINTAIN POWER EQUIPMENT--The student will be able to:

22.01 Follow safety practices when using and maintaining power equipment.
22.02 Use a masonry saw with an abrasive blade to cut masonry units.
22.03 Use a masonry saw with a diamond blade to cut masonry units.
22.04 Set up, operate, and maintain power tools and equipment.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
CONCRETE FINISHER - 844.364-010

23.0 PERFORM CONSTRUCTION DETAILS--The student will be able to:

23.01 Build 4" and 8" brick corners.
23.02 Build 4", 6", 8", and 12" block corners.
23.03 Build reinforced masonry walls, composite walls, and cavity walls.
23.04 Erect corner poles.
23.05 Course brick heights.
23.06 Build brick and/or block sills, steps, piers, pilasters, columns, brick chase, flue, paving, BBQ pits, and planters.
23.07 Construct a brick-veneer wall.
23.08 Set precast and built-in lintels.
23.09 Build modular brick walls.
23.10 Lay glass blocks.
23.11 Set door jams.
23.12 Reinforce masonry walls.

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24.0 DEMONSTRATE PRODUCTIVITY SKILLS--The student will be able to:

24.01 Lay and joint standard brick on a straight brick-veneer wall, with established leads, at an average daily rate of:
- a. 100-200
- b. 200-300
- c. 300-400
- d. 400-500
- e. 500-600
- f. 600-700
- g. 700-800
- h. over 800

24.02 Lay and joint 8" block on a straight block wall, with established leads, at an average daily rate of:
- a. 50-100
- b. 100-150
- c. 150-200
- d. 200-250
- e. 250-300
- f. 300-350
- g. 350-400
- h. over 400

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722610
Course Title: Masonry 1
Course Credit: 1

COURSE DESCRIPTION:

This course provides students with the competencies essential to the masonry industry. These competencies include knowledge and skills related to safety practices, the masonry industry in America, the use of hand tools, the selection and mixing of mortars and concrete, and brick and block laying.

01.0 FOLLOW SAFETY PRACTICES--The student will be able to:

- 01.01 Identify and follow general safety rules.
- 01.02 Explain the purpose of the Occupational Safety and Health Administration (OSHA).
- 01.03 Describe first-aid procedures.
- 01.04 Follow safety practices when using tools and equipment.

02.0 CHARACTERIZE THE MASONRY INDUSTRY--The student will be able to:

- 02.01 Summarize the history of the masonry industry.
- 02.02 Explain the importance of the masonry industry to the local, state, and national economy.
- 02.03 Identify employment and advancement opportunities in the masonry industry.
- 02.04 Explain the factors involved in good-quality work.

03.0 IDENTIFY AND USE HAND TOOLS--The student will be able to:

- 03.01 Identify, care for, and use basic hand tools.
- 03.02 Select hand tools for specific jobs.
- 03.03 Identify power tools.
- 03.04 Read English rules to the 1/16".
- 03.05 Read brick-spacing rules and brick modular rules.
- 03.06 Course brick to a given height with the brick spacing rule and the modular rule.

04.0 SELECT AND MIX MORTARS AND CONCRETE--The student will be able to:

- 04.01 Identify types of mortars.
- 04.02 Identify the ingredients and properties of mortars.
- 04.03 Identify the properties and characteristics of concrete.
- 04.04 Identify colored mortars (admix and factory-blended).
- 04.05 Identify the types and purposes of grouts.
- 04.06 Store and place materials.
- 04.07 Select mortars and concrete.
- 04.08 Mix mortars by hand and by machine.
- 04.09 Mix concrete by hand and by machine.

04.10 Clean up tools, equipment, and the work site.
04.11 Build a brick 4" corner return lead.

07.0 LAY BRICK AND/OR BLOCK TO THE LINE--The student will be able to:

07.01 Set up masonry materials.
07.02 Temper mortar.
07.03 Spread mortar for brick.
07.04 Pull a line from established leads.
07.05 Butter head joints.
07.06 Lay brick to the line.
07.07 Maintain proper spacing of head and bed joints.
07.08 Cut brick with a hammer, a brick set, and a trowel.
07.09 Point and tool joints in brick walls.
07.10 Repeat the above nine tasks (07.01 - 07.09) with 8" concrete block.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722620
Course Title: Masonry 2
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies necessary to the masonry industry. These competencies include knowledge and skills related to the properties, characteristics, and uses of brick and concrete block; bonding; methods of masonry practices; masonry cleaning; scaffolding; communication; and computer use.

05.0 DESCRIBE THE PROPERTIES, CHARACTERISTICS, AND USES OF BRICK--The student will be able to:

- 05.01 Explain the brick-manufacturing process.
- 05.02 Identify the properties and characteristics of brick.
- 05.03 Distinguish between standard and modular bricks.
- 05.04 Describe the different types of bricks and their principal uses.
- 05.05 Identify brick positioning in a wall.
- 05.06 Build 4" corner return leads and a wall 4 feet high and 12 feet long.

06.0 DESCRIBE THE PROPERTIES, CHARACTERISTICS, AND USES OF CONCRETE BLOCK--The student will be able to:

- 06.01 Explain the manufacturing process of concrete block.
- 06.02 Identify the properties and characteristics of concrete block.
- 06.03 Describe the different types, including shapes and sizes, of concrete blocks and their principal uses.
- 06.04 Build an 8" block corner return lead 7 courses high.

08.0 DESCRIBE THE VARIOUS TYPES AND USES OF BONDING--The student will be able to:

- 08.01 Define and describe pattern, structural, layout, and adhesive bonding.
- 08.02 Differentiate among and use stretcher, common, English, English cross, Flemish, and stack bonds.

09.0 IDENTIFY THE VARIOUS METHODS OF MASONRY PRACTICES--The student will be able to:

- 09.01 Identify the methods of basic building layouts.
- 09.02 Identify the methods of digging and pouring footings.
- 09.03 Identify the methods of forming, grading, and pouring concrete slabs.

09.04 Identify the different types of reinforced masonry, flashing, wall reinforcement, and ties.
09.05 Identify measuring tools.
09.06 Identify power equipment.

10.0 CLEAN MASONRY--The student will be able to:

10.01 Follow safety practices when cleaning masonry.
10.02 Identify reasons for cleaning.
10.03 Identify and select cleaning materials and equipment for brick and concrete block.
10.04 Prepare cleaning solutions.
10.05 Point new and old work.
10.06 Prepare the area.
10.07 Clean the wall, using different methods.

11.0 ERECT AND DISASSEMBLE BASIC SCAFFOLDS--The student will be able to:

11.01 Follow safety practices when working with ladders and scaffolds.
11.02 Erect and disassemble basic scaffolds.

12.0 APPLY APPROPRIATE COMMUNICATION AND COMPUTER SKILLS--The student will be able to:

12.01 Ask and answer questions coherently and concisely.
12.02 Read and follow written instructions and listen to and follow oral instructions.
12.03 Make oral presentations.
12.04 Write reports using word-processing software.
12.05 Read and interpret industry-related materials.
12.06 Find information in technical literature such as a manufacturer's manual.
12.07 Read and interpret the graphs, charts, diagrams, and tables commonly used in the industry.
12.08 Fill out the forms and invoices commonly used in the industry.
12.09 Demonstrate appropriate telephone communication skills.
12.10 Use industry-related computer software.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722630
Course Title: Masonry 3
Course Credit: 1

COURSE DESCRIPTION:

This course provides students with competencies in math, basic science, customer relations, employability, and entrepreneurship.

13.0 APPLY APPROPRIATE MATH SKILLS--The student will be able to:

- 13.01 Solve job-related problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
- 13.02 Solve job-related problems for ratios and proportions.
- 13.03 Determine the purchase price of items, including the sales tax.
- 13.04 Compute federal, state, and local taxes.

14.0 DEMONSTRATE AN UNDERSTANDING OF THE APPROPRIATE BASIC SCIENCE--The student will be able to:

- 14.01 Explain molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 14.02 Explain pressure measurement in terms of pounds per square inch (PSI) and inches of mercury.
- 14.03 Draw conclusions or make inferences from data.
- 14.04 Identify health-related problems caused by exposure to work-related chemicals and hazardous materials.
- 14.05 Describe the proper precautions for handling work-related chemicals and hazardous materials.

15.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

- 15.01 Exercise self-control.
- 15.02 Identify and demonstrate appropriate responses to criticism.
- 15.03 Explain the effects of positive human-relations skills on success in the business.
- 15.04 Demonstrate respect for people and property.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 16.01 Conduct a job search and identify advanced-training opportunities.
- 16.02 Secure information about a job.
- 16.03 Identify documents that may be required for a job application.
- 16.04 Complete a job-application form.
- 16.05 Demonstrate competence in job-interview techniques.
- 16.06 Demonstrate productive work habits and positive attitudes.

16.07 Demonstrate a knowledge of how to make job changes appropriately.

16.08 Demonstrate ethical and responsible practices.

16.09 Demonstrate acceptable personal-hygiene habits and a professional appearance.

16.10 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.

16.11 Explain the importance of taking pride in the quality of work performed.

16.12 Describe the importance of a drug-free workplace and industry policies toward drug use.

16.13 Describe the ramifications of a poor driving record on employment opportunities.

16.14 Describe "Florida's Right-to-Know" Law as recorded in the Florida Statutes, Chapter 442.

16.15 Explain the importance of confidentiality in the workplace.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define "entrepreneurship."

17.02 Describe the importance of entrepreneurship to the American economy and the role of small business in the free-enterprise system.

17.03 Explain the advantages and disadvantages of business ownership.

17.04 Explain the risks involved in the ownership of a business.

17.05 Identify the necessary personal characteristics of a successful entrepreneur.

17.06 Identify the business skills needed to operate a small business efficiently and effectively.

17.07 Describe the employer's responsibilities to support the business and industry.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722640
Course Title: Intermediate Masonry 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with competencies in construction drawings and specifications and in building layout.

18.0 READ CONSTRUCTION DRAWINGS AND SPECIFICATIONS--The student will be able to:

- 18.01 Identify types of drawings.
- 18.02 Identify symbols on the drawings.
- 18.03 Read and interpret simple drawings.
- 18.04 Read and interpret specifications.
- 18.05 Explain the importance of following local, state, and national codes and standards.
- 18.06 Interpret a finished schedule.
- 18.07 Use an architect's scale.

19.0 PERFORM BUILDING LAYOUT--The student will be able to:

- 19.01 Read and interpret plot plans.
- 19.02 Establish building corners.
- 19.03 Build batter boards and establish building lines and elevations.
- 19.04 Dig, prepare, and pour footings to local codes and standards.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722650
Course Title: Intermediate Masonry 5
Course Credit: 1

COURSE DESCRIPTION:

This course provides students with an in-depth study of foundation building, materials and cost estimations, and power-equipment operation.

20.0 BUILD FOUNDATIONS--The student will be able to:

- 20.01 Build an 8" block corner 7 courses high.
- 20.02 Build an 8" block corner to the correct height and range of a given foundation batter board line.
- 20.03 Bond and build an 8" block corner to the correct height and range on the opposite corner of a given foundation batter board line.
- 20.04 Pull a line and build an 8" block wall between the block corners.
- 20.05 Establish and build the other corner leads.
- 20.06 Build foundation walls to floor elevations.
- 20.07 Make foundation walls waterproof, if required.
- 20.08 Install flashing, anchor bolts, termite shields, and weep holes; install vents if a wooden floor system is used.

21.0 ESTIMATE MATERIALS AND COST--The student will be able to:

- 21.01 Estimate the materials needed for a specific job.
- 21.02 Estimate the cost of the materials, including the sales tax.

22.0 OPERATE AND MAINTAIN POWER EQUIPMENT--The student will be able to:

- 22.01 Follow safety practices when using and maintaining power equipment.
- 22.02 Use a masonry saw with an abrasive blade to cut masonry units.
- 22.03 Use a masonry saw with a diamond blade to cut masonry units.
- 22.04 Set up, operate, and maintain power tools and equipment.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8722660
Course Title: Concrete Masonry 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with an in-depth knowledge of concrete masonry. The competencies in this course relate to the use and maintenance of hand and power tools, the preparation of a site, and concrete pouring.

23.0 SELECT, USE, AND MAINTAIN HAND AND POWER TOOLS--The student will be able to:

- 23.01 Select, use, and maintain the hand tools required for concrete masonry jobs.
- 23.02 Select, use, and maintain the power tools required for concrete masonry jobs.

24.0 PREPARE A SITE FOR CONCRETE POURING--The student will be able to:

- 24.01 Excavate and grade the site.
- 24.02 Erect forms.
- 24.03 Install a vapor barrier.
- 24.04 Install reinforcement and expansion materials.
- 24.05 Install and grade stakes.

25.0 POUR AND FINISH A CONCRETE SLAB--The student will be able to:

- 25.01 Pour, place, and vibrate (if necessary) concrete.
- 25.02 Screed to grade.
- 25.03 Finish concrete.
- 25.04 Saw control joints, if necessary.
- 25.05 Protect the slab.
- 25.06 Clean up tools, equipment, and work area.

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Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Metal Fabrication
Occupational Area:	Industrial Education
	Secondary
Program Numbers	**8754300**
CIP Number	0648.050401
Grade Level	9-12, 30, 31
Length	6 credits
Certification	SHEETMETAL @7 G
	METAL WORK @7 G
	WELDING @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as pattern and model makers (89114712) layout workers (809.281-010). This program also provides supplemental training for persons previously or currently employed in this occupation.

The course content will include the following: measurement, layout, planning, design, sheetmetal work, structural steel, welding, mechanical fasteners, metal properties, heat treating and metalworking tools. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

Listed below are the courses that comprise this program when offered at the secondary level:

8754310 - Metal Fabrication 1
8754320 - Metal Fabrication 2
8754330 - Metal Fabrication 3
8754340 - Metal Fabrication 4
8754350 - Metal Fabrication 5
8754360 - Metal Fabrication 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Metal Fabrication industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: measuring and layout tools, bench metal operations, electric metal bonding operations, gas welding and cutting operations, sheetmetal operations, grinding and sharpening tools and metalworking machines.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership

training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.
The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

The particular outcomes and student performance standards which the handicapped student must master to earn credit must be specified in the student's Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate basic metal fabrication skills.
02.0 Demonstrate ability to read plans and drawings.
03.0 Perform measuring and layout operations.
04.0 Describe metals and their properties.
05.0 Operate metalworking machines.
06.0 Perform metal fabrication operations.
07.0 Perform gas welding and cutting operations.
08.0 Perform electric metal-bonding operations.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate appropriate math skills.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate and practice employability skills.
13.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Metal Fabrication
Secondary Number: 8754300
Postsecondary Number:

01.0 DEMONSTRATE BASIC METAL FABRICATION SKILLS--The student will be able to:

- 01.01 Comply with safety and operating rules and practices.
- 01.02 Maintain a clean and orderly shop.
- 01.03 Make job-related decimal and fraction calculations.
- 01.04 Solve job-related problems by adding, subtracting, multiplying and dividing numbers.
- 01.05 Solve job-related problems operating a hand-held calculator.
- 01.06 Solve job-related problems using mathematical handbooks, charts and tables.
- 01.07 Compute feet, inches and yards.
- 01.08 Use the protractor to measure angles to nearest degree.
- 01.09 Use the protractor and triangles to draw angles.
- 01.10 Demonstrate proper use of material handling techniques.

02.0 DEMONSTRATE ABILITY TO READ PLANS AND DRAWINGS--The student will be able to:

- 02.01 Identify dimensions.
- 02.02 Identify lists of materials and specifications.
- 02.03 Identify section views/detail views.
- 02.04 Disassemble and assemble parts using an exploded view drawing.
- 02.05 Interpret blueprint abbreviations.
- 02.06 Identify dimensioning of radii, round holes, fillets and chamfers.
- 02.07 Identify screw threads and bolt types.
- 02.08 Apply dimensional tolerances.
- 02.09 Identify metal fabrication symbols used in blueprints.

03.0 PERFORM MEASURING AND LAYOUT OPERATIONS--The student will be able to:

- 03.01 Perform basic geometric construction.
- 03.02 Use marking gages, center punches, scribes, surface gages, squares, dividers, dial indicators, protractors, surfaceplates, depth gages and circumference rules.
- 03.03 Develop patterns using parallel line, radial line and triangulation.
- 03.04 Make metal fabrication sketches.
- 03.05 Read and measure with steel rules.
- 03.06 Read and measure with micrometers.
- 03.07 Read and measure with vernier height gages.
- 03.08 Read and measure with dial calipers.
- 03.09 Read and measure with universal bevel protractor.
- 03.10 Measure with sine bars.
- 03.11 Read and measure with dial indicators.

04.0 DESCRIBE METALS AND THEIR PROPERTIES--The student will be able to:

- 04.01 Describe the steelmaking process.
- 04.02 Describe the differences between ferrous and non-ferrous metals.
- 04.03 Describe casting, alloys and forging.
- 04.04 Identify metals such as galvanized iron and steel, aluminum stainless steel, sheetmetal, copper and brass.
- 04.05 Identify properties of the most common metals.
- 04.06 Identify and describe common gages, shapes and dimensions of purchased materials.

05.0 OPERATE METALWORKING MACHINES--The student will be able to:

- 05.01 Identify the purpose of various types of machine shop equipment.
- 05.02 Identify types of a drill press.
- 05.03 Operate a drill press utilizing the correct drilling speed.
- 05.04 Operate a band saw utilizing the correct cutting speed.
- 05.05 Demonstrate clamping devices for securing stock for drilling.
- 05.06 Identify types and sizes of drill bits.
- 05.07 Use portable power saw equipment.
- 05.08 Use a cutoff or power hacksaw.
- 05.09 Use electric and air utility grinders.
- 05.10 Sharpen drill bits.
- 05.11 Select proper type of abrasive wheels for grinding machines.

06.0 PERFORM METAL FABRICATION OPERATIONS--The student will be able to:

- 06.01 Fabricate metal, edges and seams.
- 06.02 Use hand tools to cut, punch and shear metal.
- 06.03 Form sheetmetal using a brake, a folder, rolls and a turning machine.
- 06.04 Join metals using solder, rivets and mechanical fasteners.

07.0 PERFORM GAS WELDING AND CUTTING OPERATIONS--The student will be able to:

- 07.01 Identify welding cylinders, regulators, hoses, pressure gages and torches.
- 07.02 Describe welding equipment safety procedures.
- 07.03 Demonstrate proper flame setting.s
- 07.04 Demonstrate basic gas welding skills.
- 07.05 Demonstrate procedures for adjusting and operating the oxyacetylene cutting torch.
- 07.06 Demonstrate freehand and guide cutting of various metal thicknesses.
- 07.07 Setup and operate a plasma arc cutting machine.

08.0 PERFORM ELECTRIC METAL-BONDING OPERATIONS--The student will be able to:

- 08.01 Describe and demonstrate the spot and arc welding process.
- 08.02 Demonstrate basic procedures for safely adjusting and operating an arc welder, selecting a rod, striking and maintaining an arc, welding in various positions and clamping.

08.03 Setup and operate a spot welder.
08.04 Explain and demonstrate the MIG welding process.
08.05 Apply basic procedures for safely adjusting, operating, cleaning and maintaining MIG welding equipment.
08.06 Apply basic procedures for safely adjusting and operating a TIG welder, welding in various positions, selecting proper tips and choosing filler metal.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

12.0 DEMONSTRATE AND PRACTICE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Identify documents that may be required when applying for a job.

12.04 Complete a job application form correctly.
12.05 Demonstrate competence in job interview techniques.
12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
12.07 Identify acceptable work habits.
12.08 Demonstrate knowledge of how to make job changes appropriately.
12.09 Demonstrate acceptable employee health habits.
12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.
13.05 Identify the necessary personal characteristics of a successful entrepreneur.
13.06 Identify the business skills needed to operate a small business efficiently and effectively.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754310
Course Title: Metal Fabrication 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to familiarize the student with facilities, safety and housekeeping rules. The student will also become familiar with materials and specifications, skilled in using measuring and layout tools, developing patterns, reading drawings and making sketches.

01.0 DEMONSTRATE BASIC METAL FABRICATION SKILLS--The student will be able to:

- 01.01 Comply with safety and operating rules and practices.
- 01.02 Maintain a clean and orderly shop.
- 01.03 Make job-related decimal and fraction calculations.
- 01.04 Solve job-related problems by adding, subtracting, multiplying and dividing numbers.
- 01.05 Solve job-related problems operating a hand-held calculator.
- 01.06 Solve job-related problems using mathematical handbooks, charts and tables.
- 01.07 Compute feet, inches and yards.
- 01.08 Use the protractor to measure angles to nearest degree.
- 01.09 Use the protractor and triangles to draw angles.
- 01.10 Demonstrate proper use of material handling techniques.

02.0 DEMONSTRATE ABILITY TO READ PLANS AND DRAWINGS--The student will be able to:

- 02.01 Identify dimensions.
- 02.02 Identify lists of materials and specifications.
- 02.03 Identify section views/detail views.
- 02.04 Disassemble and assemble parts using an exploded view drawing.
- 02.05 Interpret blueprint abbreviations.
- 02.06 Identify dimensioning of radii, round holes, fillets and chamfers.
- 02.07 Identify screw threads and bolt types.
- 02.08 Apply dimensional tolerances.
- 02.09 Identify metal fabrication symbols used in blueprints.

03.0 PERFORM MEASURING AND LAYOUT OPERATIONS--The student will be able to:

- 03.01 Perform basic geometric construction.
- 03.02 Use marking gages, center punches, scribes, surface gages, squares, dividers, dial indicators, protractors, surfaceplates, depth gages and circumference rules.
- 03.03 Develop patterns using parallel line, radial line and triangulation.
- 03.04 Make metal fabrication sketches.

03.05 Read and measure with steel rules.
03.06 Read and measure with micrometers.
03.07 Read and measure with vernier height gages.
03.08 Read and measure with dial calipers.
03.09 Read and measure with universal bevel protractor.
03.10 Measure with sine bars.
03.11 Read and measure with dial indicators.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754320
Course Title: Metal Fabrication 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to familiarize the students with the steelmaking process and help them identify ferrous and non-ferrous metals, castings, forgings, alloys and the gages, shapes and dimensions of purchased materials. The student will also learn to identify, care for and use metalworking machines.

04.0 DESCRIBE METALS AND THEIR PROPERTIES--The student will be able to:

- 04.01 Describe the steelmaking process.
- 04.02 Describe the differences between ferrous and non-ferrous metals.
- 04.03 Describe casting, alloys and forging.
- 04.04 Identify metals such as galvanized iron and steel, aluminum stainless steel, sheetmetal, copper and brass.
- 04.05 Identify properties of the most common metals.
- 04.06 Identify and describe common gages, shapes and dimensions of purchased materials.

05.0 OPERATE METALWORKING MACHINES--The student will be able to:

- 05.01 Identify the purpose of various types of machine shop equipment.
- 05.02 Identify types of a drill press.
- 05.03 Operate a drill press utilizing the correct drilling speed.
- 05.04 Operate a band saw utilizing the correct cutting speed.
- 05.05 Demonstrate clamping devices for securing stock for drilling.
- 05.06 Identify types and sizes of drill bits.
- 05.07 Use portable power saw equipment.
- 05.08 Use a cutoff or power hacksaw.
- 05.09 Use electric and air utility grinders.
- 05.10 Sharpen drill bits.
- 05.11 Select proper type of abrasive wheels for grinding machines.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 11.02 Draw conclusions or make inferences from data.
- 11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754330
Course Title: Metal Fabrication 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop basic skills in basic metal fabrication operations.

06.0 PERFORM METAL FABRICATION OPERATIONS--The student will be able to:

- 06.01 Fabricate metal, edges and seams.
- 06.02 Use hand tools to cut, punch and shear metal.
- 06.03 Form sheetmetal using a brake, a folder, rolls and a turning machine.
- 06.04 Join metals using solder, rivets and mechanical fasteners.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754340
Course Title: Metal Fabrication 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop skills in the safe use of gas welding and cutting equipment.

07.0 PERFORM GAS WELDING AND CUTTING OPERATIONS--The student will be able to:

- 07.01 Identify welding cylinders, regulators, hoses, pressure gages and torches.
- 07.02 Describe welding equipment safety procedures.
- 07.03 Demonstrate proper flame settings.
- 07.04 Demonstrate basic gas welding skills.
- 07.05 Demonstrate procedures for adjusting and operating the oxyacetylene cutting torch.
- 07.06 Demonstrate freehand and guide cutting of various metal thicknesses.
- 07.07 Setup and operate a plasma arc cutting machine.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754350
Course Title: Metal Fabrication 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to develop skills in the safety and use of an arc welder and to familiarize the student with the basic procedures and the advantages of MIG and TIG welding.

08.0 PERFORM ELECTRIC METAL-BONDING OPERATIONS--The student will be able to:

08.01 Describe and demonstrate the spot and arc welding process.
08.02 Demonstrate basic procedures for safely adjusting and operating an arc welder, selecting a rod, striking and maintaining an arc, welding in various positions and clamping.
08.03 Setup and operate a spot welder.
08.04 Explain and demonstrate the MIG welding process.
08.05 Apply basic procedures for safely adjusting, operating, cleaning nd maintaining MIG welding equipment.
08.06 Apply basic procedures for safely adjusting and operating a TIG elder, welding in various positions, selecting proper tips and choosing filler metal.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754360
Course Title: Metal Fabrication 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to help the students demonstrate employability and entrepreneurship skills.

12.0 DEMONSTRATE AND PRACTICE EMPLOYABILITY SKILLS--The student will be able to:

- 12.01 Conduct a job search.
- 12.02 Secure information about a job.
- 12.03 Identify documents that may be required when applying for a job.
- 12.04 Complete a job application form correctly.
- 12.05 Demonstrate competence in job interview techniques.
- 12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
- 12.07 Identify acceptable work habits.
- 12.08 Demonstrate knowledge of how to make job changes appropriately.
- 12.09 Demonstrate acceptable employee health habits.
- 12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 13.01 Define entrepreneurship.
- 13.02 Describe the importance of entrepreneurship to the American economy.
- 13.03 List the advantages and disadvantages of business ownership.
- 13.04 Identify the risks involved in ownership of a business.
- 13.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 13.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Micro Electronics Manufacturing Processing
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I150499**
CIP Number	0615.049902
Grade Level	30, 31
Length	1200 hours
Certification	ELECTRONICS @7 G
	TEC ELEC @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as Microelectronic Manufacturing Process Technologists. This program also provides supplemental training for persons previously or currently employed in this occupation.

This program includes selected competencies from the common core electronics program.

The content includes, but is not limited to the following: statistical process control, direct current (DC) circuits, alternating current (AC) circuits, analog, solid-state and digital devices, use of circuit diagrams and schematics, high reliability soldering, laboratory practices; clean room contamination control, computer literacy, human relations, employability skills, work safety practices and ethics.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Micro Electronics industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, test equipment, materials and processes found in the semiconductor manufacturing industry. Students will troubleshoot, reassemble and calibrate precision equipment used in the microelectronic manufacturing process.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer, which includes instructional objectives and a list of on-the-job and in-school learning experiences; work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level entry requirement for this postsecondary adult vocational program is: Mathematics 10.0, Language 10.0, and Reading 10.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

The typical length of this program for the average achieving student is 1200 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in laboratory practices.
02.0 Demonstrate proficiency in oral and written communications.
03.0 Demonstrate proficiency in mathematics functions.
04.0 Demonstrate proficiency in the application of chemistry and physics to the manufacturing process.
05.0 Demonstrate proficiency in DC circuits.
06.0 Demonstrate proficiency in AC circuits.
07.0 Demonstrate proficiency in solid-state devices.
08.0 Demonstrate proficiency in analog circuits.
09.0 Demonstrate proficiency in digital circuits.
10.0 Demonstrate proficiency in the use of computers.
11.0 Demonstrate proficiency in general and environmental health and safety procedures.
12.0 Demonstrate proficiency in clean-room contamination control.
13.0 Demonstrate proficiency in concepts of Statistical Process Control.
14.0 Demonstrate proficiency in non-destructive testing.
15.0 Demonstrate employability skills.
16.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Micro Electronics Manufacturing Processing
Secondary Number:
Postsecondary Number: I150499

01.0 DEMONSTRATE PROFICIENCY IN LABORATORY PRACTICES--The student will be able to:

- 01.01 Apply proper OSHA safety standards.
- 01.02 Make electrical connections.
- 01.03 Identify and use hand tools properly.
- 01.04 Demonstrate acceptable soldering and desoldering techniques.

02.0 DEMONSTRATE PROFICIENCY IN ORAL AND WRITTEN COMMUNICATIONS--The student will be able to:

- 02.01 Identify methods to improve reading techniques.
- 02.02 Describe the methods to improve memory.
- 02.03 Describe effective listening styles.
- 02.04 Demonstrate the note taking process.
- 02.05 Identify techniques in effective test taking.
- 02.06 Prepare a variety of written industrial communications.
- 02.07 Prepare and present individual and group oral presentations.

03.0 DEMONSTRATE PROFICIENCY IN MATHEMATICS FUNCTIONS--The student will be able to:

- 03.01 Solve problems using the manipulation of numbers, fractions, decimals, percents, integers, and exponents.
- 03.02 Solve problems requiring the use of scientific notation.
- 03.03 Solve problems requiring the use of algebraic expressions.
- 03.04 Solve problems requiring the use of graphing relations and functions.
- 03.05 Solve problems requiring the use of geometric and trigonometric functions.
- 03.06 Apply mathematic functions to the manufacturing process.

04.0 DEMONSTRATE PROFICIENCY IN THE APPLICATION OF CHEMISTRY AND PHYSICS TO THE MANUFACTURING PROCESS--The student will be able to:

- 04.01 Identify chemical elements from their symbols and their placement in the periodic table.
- 04.02 Describe the basic atomic structure of specific elements.
- 04.03 Describe the three basic states of matter.
- 04.04 Identify the basic properties of acids, bases and salts.
- 04.05 Identify the characteristics of ionic and covalent bonds.

04.06 Describe the effects of the three basic laws of thermodynamics on the manufacturing of electronics components.

04.07 Describe electrochemistry processes used in industrial processes such as electroplating.

04.08 Describe and measure force in mechanical, fluid, electrical and thermal systems.

04.09 Describe how work in mechanical, fluid and electrical systems involves the presence of force and movement.

04.10 Identify and measure rate in mechanical, fluid, electrical and thermal systems.

04.11 Identify and measure resistance in mechanical, fluid, electrical and thermal systems.

04.12 Identify and measure energy in mechanical, fluid, electrical and thermal systems.

04.13 Identify force transformers in linear mechanical, rotational mechanical, fluid and electrical systems.

04.14 Identify wave and vibration theory.

04.15 Describe light and optical systems in the manufacturing workplace.

05.0 DEMONSTRATE PROFICIENCY IN DIRECT CURRENT (DC) CIRCUITS--The student will be able to:

05.01 Solve algebraic problems to include exponentials (prerequisite to DC).

05.02 Solve problems in electronics units utilizing metric prefixes.

05.03 Relate electricity to the nature of matter.

05.04 Identify sources of electricity.

05.05 Define voltage, current, resistance, power and energy.

05.06 Apply Ohm's law and power formulas.

05.07 Read and interpret color codes and symbols to identify electrical components and values.

05.08 Measure properties of a circuit using volt-ohm meter (VOM) and digital volt-ohm meter (DVM) and oscilloscopes.

05.09 Compute conductance and compute and measure resistance of conductors and insulators.

05.10 Apply Ohm's law to series circuits.

05.11 Construct and verify operation of series circuits.

05.12 Analyze and troubleshoot series circuits.

05.13 Apply Ohm's law to parallel circuits.

05.14 Construct and verify the operation of parallel circuits.

05.15 Analyze and troubleshoot parallel circuits.

05.16 Apply Ohm's law to series-parallel and parallel-series circuits.

05.17 Construct and verify the operation of series-parallel and parallel-series and bridge circuits.

05.18 Troubleshoot series-parallel and parallel-series and bridge circuits.

05.19 Identify and define voltage divider circuits (loaded and unloaded).

05.20 Construct and verify the operation of voltage divider circuits (loaded and unloaded).

05.21 Analyze and troubleshoot voltage divider circuits (loaded and unloaded).
05.22 Apply maximum power transfer theory.
05.23 Construct and verify the operation of DC circuits that demonstrate the maximum power transfer theory.
05.24 Describe magnetic properties of circuits and devices.
05.25 Determine the physical and electrical characteristics of capacitors and inductors.
05.26 Describe reactive-capacitance (R-C) and inductive reactance(R-L) time constants and classify the output of differentiators and integrators.
05.27 Setup and operate power supplies for DC circuits.

06.0 DEMONSTRATE PROFICIENCY IN ALTERNATING CURRENT (AC) CIRCUITS--The student will be able to:

06.01 Solve basic trigonometric problems as applicable to electronics (prerequisite to AC).
06.02 Identify properties of an AC signal.
06.03 Identify AC sources.
06.04 Analyze and measure AC signals utilizing DVM and oscilloscope.
06.05 Define the characteristics of AC capacitive circuits.
06.06 Construct and verify the operation of AC capacitive circuits.
06.07 Analyze and troubleshoot AC capacitive circuits.
06.08 Define the characteristics of AC inductive circuits.
06.09 Construct and verify the operation of AC inductive circuits.
06.10 Analyze and troubleshoot AC inductive circuits.
06.11 Define and apply the principles of transformers and AC circuits.
06.12 Construct and verify the operation of AC circuits utilizing transformers.
06.13 Analyze and troubleshoot AC circuits utilizing transformers.
06.14 Analyze and troubleshoot differentiator and integrator circuits.
06.15 Define the characteristics of resistance inductance capacitance (RLC) circuits (series, parallel and complex).
06.16 Define the characteristics of series and parallel resonant circuits.
06.17 Define the characteristics of frequency selective filter circuits.
06.18 Construct and verify the operation of frequency selective filter circuits.
06.19 Define basic motor theory and operation.
06.20 Define basic generator theory and operation.

07.0 DEMONSTRATE PROFICIENCY IN SOLID-STATE DEVICES--The student will be able to:

07.01 Identify and define properties of semiconductor materials.
07.02 Identify and define operating characteristics and applications of junction diodes.
07.03 Identify and define operating characteristics and applications of special diodes.
07.04 Construct diode circuits.
07.05 Analyze and troubleshoot diode circuits.
07.06 Identify and define operating characteristics and application of bipolar transistors.
07.07 Identify and define operating characteristics and applications of field effect transistors.
07.08 Identify and define operating characteristics and applications of single-stage amplifiers.
07.09 Construct single-stage amplifiers.
07.10 Analyze and troubleshoot single-stage amplifiers.
07.11 Setup and operate a DVM for solid-state devices.
07.12 Setup and operate power supplies for solid-state devices.
07.13 Setup and operate oscilloscopes for solid-state devices.
07.14 Setup and operate function generators for solid-state devices.

08.0 DEMONSTRATE PROFICIENCY IN ANALOG CIRCUITS--The student will be able to:

08.01 Identify and define operating characteristics and applications of linear integrated circuits.
08.02 Identify and define operating characteristics and applications of basic power supplies and filters.
08.03 Construct basic power supplies and filters.
08.04 Identify and define operating characteristics and applications of differential and operational amplifiers.
08.05 Construct differential and operational amplifier circuits.
08.06 Identify and define operating characteristics of audio power amplifiers.
08.07 Construct audio power amplifiers.
08.08 Analyze and troubleshoot audio power amplifiers.
08.09 Identify and define operating characteristics and applications of power supply regulator circuits.
08.10 Construct power supply regulator circuits.
08.11 Identify and define operating characteristics and applications of active filters.
08.12 Construct active filter circuits.
08.13 Identify and define operating characteristics and applications of sinusoidal and nonsinusoidal oscillator circuits.
08.14 Construct oscillator circuits.

09.0 DEMONSTRATE PROFICIENCY IN DIGITAL CIRCUITS--The student will be able to:

09.01 Define and apply numbering systems to codes and arithmetic operations.

09.02 Analyze and minimize logic circuits using Boolean operations.
09.03 Setup and operate oscilloscopes for digital circuits.
09.04 Setup and operate pulse generators for digital circuits.
09.05 Identify types of logic gates and their truth tables.
09.06 Construct combinational logic circuits using integrated circuits.
09.07 Troubleshoot logic circuits.
09.08 Analyze types of flip-flops and their truth tables.
09.09 Construct flip-flops using integrated circuits.
09.10 Troubleshoot flip-flops.
09.11 Identify, define and measure characteristics of integrated circuits (IC) logic families.
09.12 Identify types of registers and counters.
09.13 Construct registers and counters using flip-flops and logic gates.
09.14 Analyze clock and timing circuits.
09.15 Construct clock and timing circuits.
09.16 Identify types of digital displays.

10.0 DEMONSTRATE PROFICIENCY IN USE OF COMPUTERS--The student will be able to:

10.01 Use the personal computer disk operating system.
10.02 Use word processor applications programs.
10.03 Use spreadsheet applications programs.
10.04 Use electronic mail applications programs.

11.0 DEMONSTRATE PROFICIENCY IN IDENTIFICATION OF GENERAL AND ENVIRONMENTAL HEALTH AND SAFETY PROCEDURES--The student will be able to:

11.01 Identify household hazards.
11.02 Identify and report electrical hazards.
11.03 Identify and report chemical hazards.
11.04 Identify and report environmental hazards.
11.05 Describe chemical handling procedures.
11.06 Describe fire safety procedures.
11.07 Identify laser safety procedures.
11.08 Administer CPR.

12.0 DEMONSTRATE PROFICIENCY IN CLEANROOM CONTAMINATION CONTROL--The student will be able to:

12.01 Identify cleanroom classification standards.
12.02 Identify cleanroom garment procedures.
12.03 Identify pure water techniques.
12.04 Identify electro static control procedures.
12.05 Identify pure chemical techniques.
12.06 Identify surface particle detection procedures.
12.07 Identify wafer automation and transfer systems.

13.0 DEMONSTRATE PROFICIENCY IN STATISTICAL PROCESS CONTROL--The student will be able to:

13.01 Define statistics and statistical process control.
13.02 Apply the terms of statistical process control to the collection, manipulation, and display of meaningful data.
13.03 Calculate probabilities, given specific sets of data, and given a range of data.
13.04 Assimilate data, define its purpose, identify an appropriate display device (histogram, stem and leaf, running charts, pareto charts, fishbone diagram) and interpret its meaning.
13.05 Define, identify, construct, calculate, interpret control charts.

14.0 DEMONSTRATE PROFICIENCY IN NON-DESTRUCTIVE TESTING--The student will be able to:

14.01 Describe pressure and leak testing procedures.
14.02 Describe the procedures for liquid penetration inspection.
14.03 Describe the procedures for thermal testing.
14.04 Describe X-ray radiography theory.
14.05 Describe ultrasonics testing procedures.
14.06 Describe dynamic testing procedures.

15.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

15.01 Conduct a job search.
15.02 Secure information about a job.
15.03 Identify documents which may be required when apply for a job interview.
15.04 Complete a job application form correctly.
15.05 Demonstrate competence in job interview techniques.
15.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employee.
15.07 Identify acceptable work habits.
15.08 Demonstrate knowledge of how to make job changes appropriately.
15.09 Demonstrate acceptable employee health habits.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

16.01 Define entrepreneurship.
16.02 Describe the importance of entrepreneurship to the American economy.
16.03 List the advantages and disadvantages of business ownership.
16.04 Identify the risks involved in ownership of a business.
16.05 Identify the necessary personal characteristics of a successful entrepreneur.
16.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Micro Electronics Manufacturing Technology
Occupational Area:	Industrial
	PSV
CIP Number	0615030303
Grade Level	College Credits
Length	AS Degree/68

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as Microelectronic Manufacturing Process Technologists. This program also provides supplemental training for persons previously or currently employed in this occupation.

This program includes selected competencies from the common core electronics program.

The content includes, but is not limited to the following: statistical process control, direct current (DC) circuits, alternating (AC) circuits, analog, solid-state and digital devices, use of circuit diagrams and schematics, high reliability soldering, laboratory practices; clean room contamination control, computer literacy, human relations, employability skills, work safety practices and ethics.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Microelectronics Manufacturing Technology industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, test equipment, materials and processes found in the semiconductor manufacturing industry. Students will troubleshoot, reassemble and calibrate precision equipment used in the microelectronic manufacturing process.

III. **SPECIAL NOTE:** The vocational Industrial Clubs of America, Inc., is an appropriate vocational student organization for providing leadership training experiences and reinforcing specific vocational skills. When provided, these activities are considered an integral part of instructional program.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training agreement, a training plan signed by the student, teacher and employer, including instructional objectives and a list of on-the-job learning experiences and a work station which reflects equipment,

skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must be paid for work performed.

The standard credit hour length for this program is 68 according to SBR 6A-14.030.

IV. **INTENDED OUTCOMES**: After successfully completing this program, the student will be able to:

01.0 Demonstrate proficiency in laboratory practices.
02.0 Demonstrate proficiency in the application of chemistry and physics to the manufacturing process.
03.0 Demonstrate proficiency in quality management.
04.0 Demonstrate proficiency in DC circuits.
05.0 Demonstrate proficiency in AC circuits.
06.0 Demonstrate proficiency in solid-state devices.
07.0 Demonstrate proficiency in analog circuits.
08.0 Demonstrate proficiency in digital circuits.
09.0 Demonstrate proficiency in the use of computers.
10.0 Demonstrate proficiency in microelectronics manufacturing process.
11.0 Demonstrate proficiency in cleanroom contamination control.
12.0 Demonstrate proficiency in concepts of Statistical Process Control.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Micro Electronics Manufacturing Technology
Secondary Number:
Postsecondary Number: 0615030303

01.0 **DEMONSTRATE PROFICIENCY IN LABOR PRACTICES**--The student will be able to:

- 01.01 Apply proper Occupational Safety Health Administration (ASHA) safety standards.
- 01.02 Make electrical connections in accordance with MIL-STD 2000.
- 01.03 Identify and use hand tools properly.
- 01.04 Identify and use power tools properly.
- 01.05 Demonstrate acceptable soldering techniques.
- 01.06 Demonstrate acceptable desoldering techniques.
- 01.07 Demonstrate electrostatic discharge (ESD) safety procedures.
- 01.08 Describe the construction of printed circuit boards (PCB's).
- 01.09 Identify MIL-STD 2000 soldering criteria.
- 01.10 Identify soldering connections failing MIL-STD 2000 criteria.
- 01.11 Demonstrate rework and repair techniques.

02.0 **DEMONSTRATE PROFICIENCY IN THE APPLICATION OF CHEMISTRY AND PHYSICS TO THE MANUFACTURING PROCESS**--The student will be able to:

- 02.01 Identify chemical elements from their symbols and their placement in the periodic table.
- 02.02 Describe the basic atomic structure of specific elements.
- 02.03 Describe the three basic states of matter.
- 02.04 Identify the basic properties of acids, bases and salts.
- 02.05 Identify the characteristics of ionic and covalent bonds.
- 02.06 Describe chemical handling procedures.
- 02.07 Describe the effects of the three basic laws of thermodynamics on the manufacturing of electronics components.
- 02.08 Describe electrochemistry process used in industrial processes such as electroplating.
- 02.09 Describe and measure force in mechanical, fluid, electrical and thermal systems.
- 02.10 Describe how work in mechanical, fluid and electrical systems involves the presence of force and movement.
- 02.11 Identify and measure rate in mechanical, fluid, electrical and thermal systems.
- 02.12 Identify and measure resistance in mechanical, fluid, electrical and thermal systems.
- 02.13 Identify and measure energy in mechanical, fluid, electrical and thermal systems.

02.14 Identify force transformers in linear mechanical, rotational mechanical, fluid and electrical systems.
02.15 Identify wave and vibration theory.
02.16 Describe light and optical systems in the manufacturing workplace.

03.0 **DEMONSTRATE PROFICIENCY IN QUALITY MANAGEMENT**--The student will be able to:

03.01 Identify basic quality philosophies.
03.02 Identify the basic quality roles in manufacturing.
03.04 Demonstrate problem solving techniques.
03.05 Identify quality program implementation process.
03.06 Participate in self-directed work items.
03.07 Identify quality recognitions programs.

04.0 **DEMONSTRATE PROFICIENCY IN DIRECT CURRENT (DC) CIRCUITS**--The student will be able to:

04.01 Solve algebraic problems to include exponentials (pre-requisite to DC).
04.02 Solve problems in electronics units utilizing metric prefixes.
04.03 Relate electricity to the nature of matter.
04.04 Identify sources of electricity.
04.05 Define voltage, current, resistance, power and energy.
04.06 Apply Ohm's law and power formulas.
04.07 Read and interpret color codes and symbols to identify electrical components and values.
04.08 Measure properties of a circuit using volt-ohm meter (VOM) and digital volt-ohm meter (DVM) and oscilloscopes.
04.09 Compute conductance and compute and measure resistance of conductors and insulators.
04.10 Apply ohm's law to series circuits.
04.11 Construct and verify operation of series circuits.
04.12 Analyze and troubleshoot series circuits.
04.13 Apply ohm's law to parallel circuits.
04.14 Construct and verify the operation of parallel circuits.
04.15 Analyze and troubleshoot parallel circuits.
04.16 Apply ohm's law to series-parallel and parallel-series circuits.
04.17 Construct and verify the operation of series-parallel and parallel-series and bridge circuits.
04.18 Troubleshoot series-parallel and parallel-series and bridge circuits.
04.19 Identify and define voltage divider circuits (loaded and unloaded).
04.20 Construct and verify operation of voltage divider circuits (loaded and unloaded).
04.21 Analyze and troubleshoot voltage divider circuits (loaded and unloaded).
04.22 Apply maximum power transfer theory.
04.23 Construct and verify the operation of DC circuits that demonstrate the maximum power transfer theory.

04.24 Describe magnetic properties of circuits and devices.
04.25 Determine the physical and electrical characteristics of capacitors and indicators.
04.26 Describe reactive-capacitance (R-C) and inductive reactance (R-L) time constants and classify the output of differentiators and integrators.
04.27 Setup and operate power supplies for DC circuits.

05.0 **DEMONSTRATE PROFICIENCY IN ALTERNATING CURRENT (AC) CIRCUITS**--The student will be able to:

05.01 Solve basic trigonometric problems as applicable to electronics (prerequisite to AC).
05.02 Identify properties of an AC signal.
05.03 Identify AC sources.
05.04 Analyze and measure AC signals utilizing DVM and oscilloscope.
05.05 Define the characteristics of AC capacitive circuits.
05.06 Construct and verify the operation of AC capacitive circuits.
05.07 Analyze and troubleshoot AC capacitive circuits.
05.08 Define the characteristics of AC inductive circuits.
05.09 Construct and verify the operation of AC inductive circuits.
05.10 Analyze and troubleshoot AC inductive circuits.
05.11 Define and apply the principles of transformers and AC circuits.
05.12 Construct and verify the operation of AC circuits utilizing transformers.
05.13 Analyze and troubleshoot AC circuits utilizing transformers.
05.14 Analyze and troubleshoot differentiator and integrator circuits.
05.15 Define the characteristics of resistance inductance capacitance (RLC) circuits (serial, parallel and complex).
05.16 Define the characteristics of series and parallel resonant circuits.
05.17 Define the characteristics of frequently selective filter circuits.
05.18 Construct and verify the operation of frequently selective filter circuits.
05.19 Define basic motor theory and operation.
05.20 Define basic generator theory and operation.

06.0 **DEMONSTRATE PROFICIENCY IN SOLID-STATE DEVICES**--The student will be able to:

06.01 Identify and define properties of semiconductor materials.
06.02 Identify and define operating characteristics and applications of junction diodes.
06.03 Identify and define operating characteristics and applications of special diodes.

06.04 Construct diode circuits.
06.05 Analyze and troubleshoot diode circuits.
06.06 Identify and define operating characteristics and applications of bipolar transistors.
06.07 Identify and define operating characteristics and applications of field effect transistors.
06.08 Identify and define operating characteristics and applications of single-stage amplifiers.
06.09 Construct single-stage amplifiers.
06.10 Analyze and troubleshoot single-stage amplifiers.
06.11 Setup and operate a DVM for solid-state devices.
06.12 Setup and operate power supplies for solid-state devices.
06.13 Setup and operate oscilloscopes for solid-state devices.
06.14 Setup and operate function generators for solid-state devices.

07.0 **DEMONSTRATE PROFICIENCY IN ANALOG CIRCUITS**--The student will be able to:

07.01 Identify and define operating characteristics and applications of linear integrated circuits.
07.02 Identify and define operating characteristics and applications of basic power suppliers and filters.
07.03 Construct basic power supplies and filters.
07.04 Identify and define operating characteristics and applications of differential and operational amplifiers.
07.05 Construct differential and operational amplifier circuits.
07.06 Identify and define operating characteristics of audio power amplifiers.
07.07 Construct audio power amplifiers.
07.08 Analyze and troubleshoot audio power amplifiers.
07.09 Identify and define operating characteristics and applications of power supply regulator circuits.
07.10 Construct power supply regulator circuits.

07.11 Identify and define operating characteristics and applications of active filters.
07.12 Construct active filter circuits.
07.13 Identify and define operating characteristics and applications of sinusoidal and non-sinusoidal oscillator circuits.
07.14 Construct oscillator circuits.

08.0 **DEMONSTRATE PROFICIENCY IN DIGITAL CIRCUITS**--The student will be able to:

08.01 Define and apply numbering systems to codes and arithmetic operations.
08.02 Analyze and minimize logic circuits using Boolean operations.
08.03 Setup and operate oscilloscopes for digital circuits.
08.04 Setup and operate pulse operators for digital circuits.
08.05 Identify types of logic gates and their truth tables.

08.06 Construct combinational logic circuits using integrated circuits.
08.07 Troubleshoot logic circuits.
08.08 Analyze types of flip-flops and their truth tables.
08.09 Construct flip-flops using integrated circuits.
08.10 Troubleshoot flip-flops.
08.11 Identify, define and measure characteristics of integrated circuits (IC) logic families.
08.12 Identify types of registers and counters.
08.13 Construct registers and counters using flip-flops and logic gates.
08.14 Analyze clock and timing circuits.
08.15 Construct clock and timing circuits.
08.16 Identify types of digital displays.

09.0 **DEMONSTRATE PROFICIENCY IN USE OF COMPUTERS**--The student will be able to:

09.01 Use the personal computer disk operating system.
09.02 Use word processor applications programs.
09.03 Use spreadsheet applications programs.
09.04 Use electronic mail applications programs.

10.0 **DEMONSTRATE PROFICIENCY IN IDENTIFICATION OF MICROELECTRONIC MANUFACTURING PROCESSES**--The student will be able to:

10.01 Describe mask fabrication procedures.
10.02 Describe semiconductor materials preparation procedures and equipment.
10.03 Describe procedures and equipment used in photolithography.
10.04 Describe procedures and equipment used in the etch process.
10.05 Describe procedures and equipment used in the diffusion process.
10.06 Describe procedures and equipment used in the film process.
10.07 Describe procedures and equipment used in the test process.
10.08 Describe procedures and equipment used in the assembly process.
10.09 Identify and report electrical hazards associated with a microelectronic manufacturing environment.
10.10 Identify and report chemical hazards associated with a microelectronic manufacturing environment.
10.11 Identify and report environmental hazards associated with a microelectronic manufacturing environment.
10.12 Describe fire safety procedures associated with a microelectronic manufacturing environment.
10.13 Identify laser safety procedures associated with a microelectronic manufacturing environment.

11.0 **DEMONSTRATE PROFICIENCY IN CLEANROOM CONTAMINATION CONTROL**--The student will be able to:

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11.01 Identify cleanroom classification standards.
11.02 Demonstrate cleanroom garment procedures.
11.03 Identify pure water techniques.
11.04 Identify electrostatic control procedures.
11.05 Identify pure chemical techniques.
11.06 Identify surface particle detection procedures.
11.07 Identify water automation and transfer systems.

12.0 **DEMONSTRATE PROFICIENCY IN STATISTICAL PROCESS CONTROL**--The student will be able to:

12.01 Define statistics and statistical process control.
12.02 Apply the terms of statistical process control to the collection, manipulation, and display of meaningful data.
12.03 Calculate probabilities, given specific sets of data, and given a range of data.
12.04 Assimilate data, define its purpose, identify an appropriate display device (histogram, stem and leaf, running charts, pareto charts, fishbone digram) and interpret its meaning.
12.05 Define, identify, construct, calculate, interpret control charts.

13.0 **DEMONSTRATE EMPLOYABILITY SKILLS**--The student will be able to:

13.01 Conduct a job search.
13.02 Secure information about a job.
13.03 Identify documents which may be required when applying for a job interview.
13.04 Complete a job application form correctly.
13.05 Demonstrate competence in job interview techniques.
13.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
13.07 Identify acceptable work habits.
13.08 Demonstrate knowledge of how to make job changes appropriately.
13.09 Demonstrate acceptable employee health habits.

14.0 **DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP**--The student will be able to:

14.01 Define entrepreneurship.
14.02 Describe the importance of entrepreneurship to the American economy.
14.03 List the advantages and disadvantages of business ownership.
14.04 Identify the risks involved in ownership of a business.
14.05 Identify the necessary personal characteristics of a successful entrepreneur.
14.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Mine Safety and Health
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I150799**
CIP Number	0615079901
Grade Level	30, 31
Length	24 hours & 8 hours annual refresher
Certification	MSHA @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students to meet safety and health requirements for employment as miners working at surface mines and surface areas of underground mines as required by the Federal Mine Safety and Health Act of 1977 (Public Law 91-173 as amended by Public Law 95-164) or to provide updating and refresher training for persons previously or currently employed in these occupations as required by the Act.

The content includes, but is not limited to, instruction in the statutory rights of miners, self-rescue and respiratory devices, mine conveyances and communications systems, introduction to the work environment, mandatory health and safety standards, escape and emergency evacuation plans, ground control, first aid, hazard recognition, and accident prevention.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Mine Safety and Health industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and should include activities in the use, care, and maintenance of self-rescue and respiratory devices (where applicable); use of mine tour; fire warning signals and fire fighting procedures; hazard recognition; first aid methods and accident prevention procedures.

III. **SPECIAL NOTE:** The instruction in this program must be provided by instructors who, under Title 30 Code of Federal Regulations, Part 48, Subpart B, are Mine Safety and Health Administration (MSHA) approved instructors. The instructional content must be in accordance with the provisions of Public Law 91-173 as amended by Public Law 95-174; 30 CFR, Part 48, Subpart B, and training outlines provided by the Mine Safety and Health Administration.

Students required to receive mine safety and health training prior to employment at surface mines and surface areas of underground

mines are classified as "miners" as defined in 30 CFR, Part 48, Subpart B, Section 48.22.

The length of this program, in accordance with the provisions of Public Law 91-173 as amended by Public Law 95-164 and 30 CFR, Part 48, Subpart B, will be a minimum of 24 hours for new miners and 8 hours of annual refresher training for all miners.

IV. **INTENDED OUTCOME:** After successfully completing the program, the student will be able to:

01.0 Perform employment obligations in accordance with the statutory rights of miners as defined in the Federal Mine Safety and Health Act of 1977 (Act) and Title 30 Code of Federal Regulations (30 CFR).
02.0 Use self-rescue and respiratory devices applicable to the employment.
03.0 Use the mine system of conveyances for miners and materials with safety and use the mine communication system for safety purposes.
04.0 Demonstrate knowledge of the working environment.
05.0 Use escape and emergency evacuation routes, recognize fire warning signals, and perform firefighting procedures.
06.0 Work safely in areas of highwalls, water hazards, pits and spoil banks and practice safe work procedures during hours of darkness.
07.0 Demonstrate a knowledge of requirements for dust, noise and other health measurements.
08.0 Recognize and avoid generally hazardous conditions.
09.0 Recognize and avoid electrical hazards.
10.0 Recognize and avoid hazards related to explosives.
11.0 Observe health and safety aspects for assigned tasks.
12.0 Perform first aid measures.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate appropriate math skills.
15.0 Demonstrate appropriate understanding of basic science.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Mine Safety And Health
Secondary Number:
Postsecondary Number: I150799

01.0 PERFORM EMPLOYMENT OBLIGATIONS IN ACCORDANCE WITH THE STATUTORY RIGHTS OF MINERS AS DEFINED IN THE FEDERAL MINE SAFETY AND HEALTH ACT OF 1977 (ACT) AND TITLE 30 CODE OF FEDERAL REGULATIONS (30 CFR)--The student will be able to:

- 01.01 State the purpose of the Act and 30 CFR Part 48.
- 01.02 Summarize the rights of miners with respect to safeguarding miner safety and health.
- 01.03 Outline and authority and responsibility of the supervisor pertaining to safety and health practices.
- 01.04 Report accidents and hazards through proper channels.

02.0 USE SELF-RESCUE AND RESPIRATORY DEVICES APPLICABLE TO THE EMPLOYMENT--The student will be able to:

- 02.01 Identify self-rescue devices appropriate to the situation.
- 02.02 Use self-rescue devices effectively.
- 02.03 Identify conditions warranting use of respiratory devices.
- 02.04 Identify the appropriate type of respiratory device for use under specific conditions.
- 02.05 Use the various types of respiratory devices properly and effectively.

03.0 USE MINE CONVEYANCE SYSTEMS SAFELY AND THE MINE COMMUNICATIONS SYSTEM FOR SAFETY PURPOSES--The student will be able to:

- 03.01 Apply company, state, and federal rules with respect to the safe use of conveyance systems to transport personnel and materials.
- 03.02 Use the telephone system, warning system, and two-way radio as applicable to the employment situation.
- 03.03 Recognize and avoid the specific hazards of the work area as they pertain to haul roads, haulage equipment, pit area, blasting area, and plant area.
- 03.04 Recognize and observe both normal signs and emergency signs as appropriate.

04.0 DEMONSTRATE KNOWLEDGE OF THE WORKING ENVIRONMENT--The student will be able to:

- 04.01 Identify the principal product, secondary product, and by-products produced by the employing company.
- 04.02 Identify the mining method used (i.e., single bench, multiple bench, dredging).

04.03 Identify the mining machinery used for drilling, excavating, and haulage and explain its general function and interrelationship with other mine functions.

04.04 Identify milling methods and machinery for crushing, sizing, separation of the mining products, and explain their general function and interrelationship with other mine functions.

04.05 Identify the methods of conveyance such as belt conveyors, screw conveyors, slurry, air, vehicle, rail, water conveyances and explain their general function and interrelationship with other mine functions.

04.06 Identify the hazardous areas, communications equipment, first aid supplies, firefighting equipment, and warning signs and devices of the work area.

05.0 USE ESCAPE AND EMERGENCY EVACUATION ROUTES, RECOGNIZE FIRE WARNING SIGNALS, AND PERFORM FIREFIGHTING PROCEDURES--The student will be able to:

05.01 Follow appropriate escape and emergency evacuation routes of the mine and/or plant.

05.02 Activate an emergency alarm system.

05.03 Recognize and/or activate the firewarning signal.

05.04 Select and use the appropriate type of fire extinguisher for specific types of fires.

06.0 WORK SAFELY IN AREAS OF HIGHWALLS, WATER HAZARDS, PITS AND SPOIL BANKS AND PRACTICE SAFE WORK PROCEDURES DURING HOURS OF DARKNESS--The student will be able to:

06.01 Recognize dangers in a highwall area and make needed corrections.

06.02 Recognize water hazards and take adequate precautions.

06.03 Recognize dangers in pit and spoil bank areas and make needed corrections.

06.04 Provide adequate illumination and practice safe work procedures during hours of darkness.

07.0 DEMONSTRATE A KNOWLEDGE OF REQUIREMENTS FOR DUST, NOISE, AND OTHER HEALTH MEASUREMENTS--The student will be able to:

07.01 Recognize common surface mine health hazards, including dust, noise, gases and fumes, and caustic, acid, and toxic chemicals.

07.02 Recognize conditions approaching the danger level and identify a need for sampling and measurement.

07.03 Take measures to protect self from injury.

08.0 RECOGNIZE AND AVOID GENERALLY HAZARDOUS CONDITIONS--The student will be able to:

08.01 Define hazards and accidents and recognize their causes.

08.02 Identify the hazards associated with each task pertaining to a particular job.

08.03 Make changes in the working environment, determine appropriate safety procedures, and select and use appropriate apparel and equipment to avoid or reduce the hazard.

09.0 RECOGNIZE AND AVOID ELECTRICAL HAZARDS--The student will be able to:

09.01 Recognize the effect of the human body coming in contact with electrical power.
09.02 Identify potential electrical hazards in the mine environment.
09.03 Rescue a worker from an electrical power source.

10.0 RECOGNIZE AND AVOID HAZARDS RELATED TO EXPLOSIVES--The student will be able to:

10.01 Demonstrate a knowledge of permissible explosives for use at surface mines.
10.02 Demonstrate a knowledge of the types of hazards associated with explosives and their sources and take appropriate precautions.

11.0 OBSERVE HEALTH AND SAFETY ASPECTS FOR ASSIGNED TASKS--The student will be able to:

11.01 Analyze the health and safety aspects of assigned task.
11.02 Perform the assigned task correctly, avoiding careless or thoughtless practices that will endanger health and safety.

12.0 PERFORM FIRST AID MEASURES--The student will be able to:

12.01 Perform artificial respiration.
12.02 Control bleeding.
12.03 Treat individuals for physical shock.
12.04 Provide initial treatment for wounds and burns.
12.05 Provide initial treatment for fractures and dislocations.
12.06 Transport an injured individual without compounding the injury.
12.07 Determine type of poisoning (ingestion, absorption, inhalation) and provide appropriate initial treatment.
12.08 Take initial action to treat victims of heart attack, stroke, heat exhaustion, or epileptic convulsions.

13.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

13.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
13.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
13.03 Read and follow written and oral instructions.

13.04 Answer and ask questions coherently and concisely.
13.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
13.06 Demonstrate appropriate telephone/communication skills.

14.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

14.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
14.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
14.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
14.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
14.05 Demonstrate an understanding of federal, state and local taxes and their computation.

15.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

15.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
15.02 Draw conclusions or make inferences from data.
15.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
15.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Identify documents which may be required when applying for a job.
16.04 Complete a job application form correctly.
16.05 Demonstrate job competence in job interview techniques.
16.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
16.07 Identify acceptable work habits.
16.08 Demonstrate knowledge of how to make appropriate job changes.
16.09 Demonstrate acceptable employee health habits.
16.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to.

17.01 Define entrepreneurship.

17.02 Describe the importance of entrepreneurship to the American economy.

17.03 List the advantages and disadvantages of business ownership.

17.04 Identify the risks involved in ownership of a business.

17.05 Identify the necessary personal characteristics of a successful entrepreneur.

17.06 Identify the business skills needed to operate a small business efficiently and effectively.

17.07 Identify basic occupational licensing and insurance.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Motorcycle Service Technology
Program Type: Job Preparatory
Occupational Area: Industrial Education

	Secondary	PSAV
Program Numbers	**8766100**	**I470616**
CIP Number	0647060601	0647060601
Grade Level	9-12, 30, 31	30, 31
Length	6 credits	900 hours
Facility Code	203	203
VSO	VICA	VICA
Co-op Method	Yes	Yes
Apprenticeship	Yes	Yes
Certification	Motorcycle @7 G	Motorcycle @7 G
Basic Skills		
Math		10
Language		9
Reading		10

I. **PURPOSE:** The purpose of this program is to prepare students for employment or advanced training in the motorcycle service technology industry and for a career as a motorcycle mechanic (DOT 620.281-054) or a motorcycle mechanic with advanced training (Industry Title). This program also provides supplemental training for persons previously or currently employed in the motorcycle service technology industry and helps prepare individuals for employment in motorcycle watercraft businesses.

This program focuses on broad, transferable skills, stresses the understanding of all aspects of the motorcycle services technology industry, and demonstrates such elements of the industry as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

II. **PROGRAM STRUCTURE:** This program is a planned sequence of instruction consisting of several courses with two occupational completion points. The recommended sequence allows students to achieve the competencies necessary for employment in the industry.

At the secondary level, the Motorcycle Service Technology program consists of the following courses:

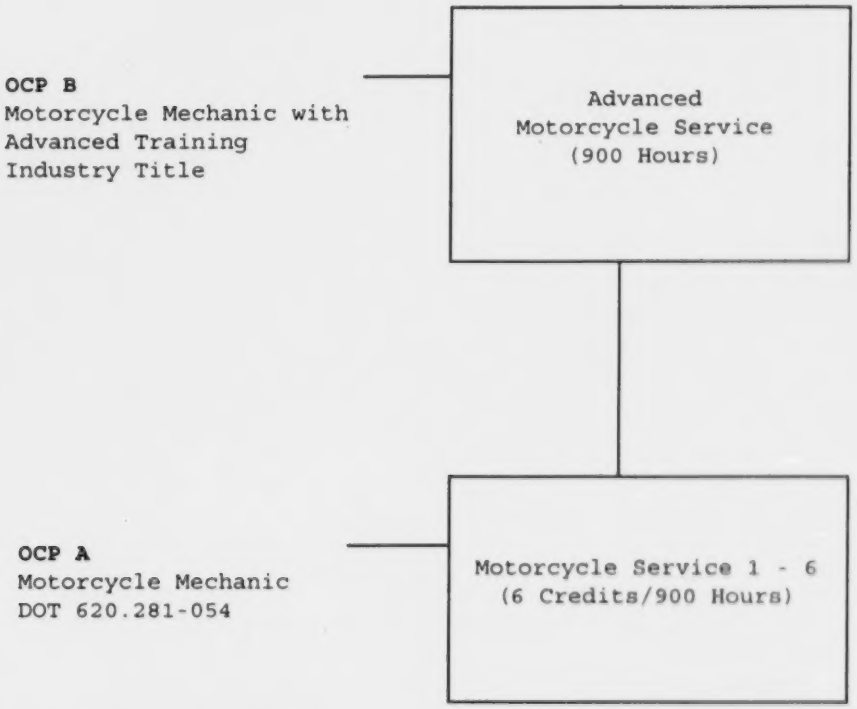
MOTORCYCLE SERVICE TECHNOLOGY - 6 secondary credits

8766110	Motorcycle Service 1
8766120	Motorcycle Service 2
8766130	Motorcycle Service 3
8766140	Motorcycle Service 4

8766150 Motorcycle Service 5
8766160 Motorcycle Service 6

The following diagram illustrates the structure of the program:

MOTORCYCLE SERVICE TECHNOLOGY 97-98



III. LABORATORY ACTIVITIES: Classroom, shop, and laboratory activities are an integral part of this program. These activities include training in the general maintenance and safe use of all instructional resources. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation.

IV. SPECIAL NOTE: The Vocational Industrial Clubs of America, Inc., (VICA) is the appropriate vocational student organization (VSO) for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

In many businesses, motorcycles and personal watercraft are sold and serviced at the same sites. The outcomes and standards in this curriculum framework apply to a variety of motorcyle power applications including personal watercraft.

The cooperative method of instruction is appropriate for this program. Whenever the cooperative method is offered, the following are required for each student: a training agreement, a training plan signed by the student, teacher and employer, including instructional objectives and a list of on-the-job and in-school learning experiences and a work station which reflects the equipment, skills, and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must be paid for work performed.

This program is offered in postsecondary adult vocational (PSAV) courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

In accordance with Rule 6A-10.040, FAC, the minimum basic-skills grade levels required for postsecondary adult vocational students to exit the program are listed before the intended outcomes for the program. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion of the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) or a remedial lab. Please refer to the Rule for exemptions.

When a secondary student with a disability is enrolled in a vocational class for which modifications to the curriculum framework have been made, the particular outcomes and student performance standards that the student must master to earn credit must be specified in the student's individual education plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

SCANS Competencies: To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this program must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and

technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Motorcycle Mechanic - DOT 620.281-054

01.0 Diagnose, service, and repair frames and suspension.
02.0 Diagnose, service, and repair wheels, tires, and brakes.
03.0 Diagnose, service, and repair drive trains.
04.0 Diagnose, service, and repair fuel and exhaust systems.
05.0 Troubleshoot and repair electrical-system components.
06.0 Tune up motorcycles.
07.0 Diagnose, service, and repair cooling systems.
08.0 Diagnose, repair, and recondition engines.
09.0 Identify personal and industry safety requirements.
10.0 Demonstrate the proper use of industry tools and equipment.
11.0 Demonstrate industry-related communication skills.
12.0 Demonstrate industry-related math skills.
13.0 Apply industry-related science to motorcycle service.
14.0 Demonstrate employability skills and awareness of entrepreneurship opportunities.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Motorcycle Service Technology
Secondary Number: 8766100
Postsecondary Number: I470616

OCCUPATIONAL COMPLETION POINT - DATA CODE A
Motorcycle Mechanic - DOT 620.281-054

01.0 DIAGNOSE, SERVICE, AND REPAIR FRAMES AND SUSPENSION--The student will be able to:

- 01.01 Identify different front- and rear- suspension systems and explain their operation.
- 01.02 Identify the parts and functions of different frames and suspension systems.
- 01.03 Service and repair front suspension.
- 01.04 Service and repair rear suspension.
- 01.05 Inspect, remove, and replace frames.
- 01.06 Install and route cables, hoses, and wiring harnesses.

02.0 DIAGNOSE, SERVICE, AND REPAIR WHEELS, TIRES, AND BRAKES--The student will be able to:

- 02.01 Explain how wheels, tires, and suspension affect chassis performance and drivability.
- 02.02 Remove, remount, and balance tires.
- 02.03 Replace and true a wheel assembly.
- 02.04 Diagnose and repair mechanical disc and drum brake systems and components.
- 02.05 Diagnose and repair hydraulic disc and drum brake systems and components.
- 02.06 Diagnose and service wheel bearings and seals.

03.0 DIAGNOSE, SERVICE, AND REPAIR DRIVE TRAINS--The student will be able to:

- 03.01 Diagnose, service, and repair chain and belt final-drive components.
- 03.02 Diagnose, service, and repair primary-drive systems.
- 03.03 Diagnose, service, and repair clutch assemblies.
- 03.04 Diagnose, service, and repair transmissions.
- 03.05 Diagnose, service, and repair shaft drives.
- 03.06 Diagnose and repair kickstart systems.

04.0 DIAGNOSE, SERVICE, AND REPAIR FUEL AND EXHAUST SYSTEMS--The student will be able to:

- 04.01 Identify components and operation of carburetion and fuel-injection systems.
- 04.02 Diagnose, service, and repair slide-type carburetors.
- 04.03 Diagnose, service, and repair constant-velocity-type (CV-type) carburetors.
- 04.04 Diagnose, service, and repair fixed-venturi carburetors.
- 04.05 Diagnose, service, and repair fuel-injection systems.
- 04.06 Diagnose, service, and repair exhaust systems.
- 04.07 Diagnose, service, and repair other fuel-delivery-system components.

05.0 TROUBLESHOOT AND REPAIR ELECTRICAL-SYSTEM COMPONENTS--The student will be able to:

- 05.01 Use the electrical theory to select appropriate test procedures.
- 05.02 Utilize electrical test equipment to isolate defective components.
- 05.03 Read and interpret a wiring diagram.
- 05.04 Troubleshoot and repair wiring harnesses.
- 05.05 Service and test batteries.
- 05.06 Troubleshoot and repair battery/points ignition systems.
- 05.07 Troubleshoot and repair battery-operated electronic-ignition systems.
- 05.08 Troubleshoot and repair magneto-ignition systems.
- 05.09 Troubleshoot and repair capacitive-discharge-ignition (CDI) systems.
- 05.10 Troubleshoot and repair half-wave and full-wave charging systems.
- 05.11 Troubleshoot and repair three-phase charging systems.
- 05.12 Troubleshoot and repair electrical starter systems.
- 05.13 Troubleshoot and repair direct current (DC) generators.

06.0 TUNE UP MOTORCYCLES--The student will be able to:

- 06.01 Diagnose drivability problems.
- 06.02 Adjust the cam chain tension.
- 06.03 Adjust the valve clearances.
- 06.04 Replace the ignition points, condenser, and spark plugs.
- 06.05 Check and set the ignition timing.
- 06.06 Adjust the carburetor and service the fuel-delivery systems.
- 06.07 Service the air-filtration systems.
- 06.08 Service and diagnose batteries.
- 06.09 Service the lubrication systems.

07.0 DIAGNOSE, SERVICE, AND REPAIR COOLING SYSTEMS--The student will be able to:

- 07.01 Identify the components of air and liquid cooling systems by name and function.
- 07.02 Diagnose, service, and repair air cooling systems.

07.03 Diagnose, service, and repair liquid cooling systems.

08.0 DIAGNOSE, REPAIR, AND RECONDITION ENGINES--The student will be able to:

08.01 Explain the engine operating theory.
08.02 Recondition a single-cylinder four-stroke engine top-end.
08.03 Recondition a multi-cylinder four-stroke engine top-end.
08.04 Recondition a two-stroke engine top-end.
08.05 Rebuild a four-stroke head.
08.06 Recondition a single-cylinder four-stroke engine bottom-end.
08.07 Recondition a multi-cylinder four-stroke engine bottom-end.
08.08 Recondition a two-stroke engine bottom-end.
08.09 Rebuild a built-up crankshaft.
08.10 Service a plain-bearing crankshaft.
08.11 Diagnose and repair electric-starter drive systems.
08.12 Diagnose and repair oil-delivery systems.

09.0 IDENTIFY PERSONAL AND INDUSTRY SAFETY REQUIREMENTS--The student will be able to:

09.01 Identify federal and state standards for health and safety, including OSHA and the Florida "Right-to-Know" law, Florida Statutes, Chapter 442.
09.02 Identify safety requirements for shop organization and management.
09.03 Identify safety requirements for the use of industry tools and equipment.
09.04 Identify fire-safety precautions.
09.05 Identify electrical-safety precautions.

10.0 DEMONSTRATE THE PROPER USE OF INDUSTRY TOOLS AND EQUIPMENT--The student will be able to:

10.01 Utilize oxyacetylene welding outfit for heating, welding, brazing, and cutting.
10.02 Use heating devices to perform service procedures.
10.03 Recondition cylinders.
10.04 Identify general and specialized hand tools.
10.05 Identify and use precision measuring tools.
10.06 Identify and use power tools.
10.07 Utilize and maintain basic shop equipment.
10.08 Identify and use fasteners.
10.09 Identify gaskets and choose sealants.

11.0 DEMONSTRATE INDUSTRY-RELATED COMMUNICATION SKILLS--The student will be able to:

11.01 Read and interpret information in parts and service manuals and other technical media.

11.02 Write logical and understandable statements or phrases to accurately complete forms or invoices commonly used in business and industry.

11.03 Read and understand graphs, charts, diagrams, and tables commonly used in the motorcycle service technology industry.

11.04 Read and follow written and oral instructions.

11.05 Answer and ask questions coherently and concisely.

11.06 Read critically by recognizing assumptions and implications and by evaluating ideas.

11.07 Demonstrate appropriate telephone and face-to-face communication skills.

12.0 DEMONSTRATE INDUSTRY-RELATED MATH SKILLS--The student will be able to:

12.01 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.

12.02 Measure tolerance(s) using millimeters, inches, and metric conversions.

12.03 Add, subtract, multiply, and divide using fractions, decimals, and whole numbers.

12.04 Prepare cost estimates for jobs using service- and flat-rate standards.

12.05 Determine the correct purchase price, including sales tax, for a materials list containing a minimum of six items.

12.06 Compute required federal, state, and local taxes.

13.0 APPLY INDUSTRY-RELATED SCIENCE TO MOTORCYCLE SERVICE--The student will be able to:

13.01 Explain how molecular action caused by temperature extremes, chemical reaction, and moisture content affect motorcycle systems.

13.02 Draw conclusions or make inferences from data.

13.03 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials and know the proper precautions required for handling such materials.

13.04 Measure pressure in terms of pounds per square inch (PSI), inches of mercury, KPA, and bars and interpret results.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS AND AWARENESS OF ENTREPRENEURSHIP OPPORTUNITIES--The student will be able to:

14.01 Define and explain the differences between becoming an employee vs. becoming an entrepreneur, including the advantages, disadvantages, and risks of both.

14.02 Identify types of businesses and opportunities for employment and entrepreneurship in the motorcycle service industry.

14.03 Identify the personal characteristics and business skills necessary for becoming a successful entrepreneur.

14.04 Conduct a job search and secure information about a specific job.

14.05 Identify documents that may be required when applying for a job interview.

14.06 Complete a job application form correctly.

14.07 Demonstrate competence in job interview techniques.

14.08 Identify or demonstrate appropriate responses to criticism from an employer, supervisor, or other employees.

14.09 Identify work habits for successful employment.

14.10 Demonstrate health and grooming habits for successful employment.

14.11 Demonstrate a knowledge of how to make appropriate job changes.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8766110
Course Title: Motorcycle Service 1
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to the motorcycle service technology industry. These competencies include safety requirements; proper use of tools and equipment; skillful use of industry-related communication, math, and science; and some knowledge of employability and entrepreneurship. There is no occupational completion point at the conclusion of this course.

09.0 IDENTIFY PERSONAL AND INDUSTRY SAFETY REQUIREMENTS--The student will be able to:

- 09.01 Identify federal and state standards for health and safety, including OSHA and the Florida "Right-to-Know" law, Florida Statutes, Chapter 442.
- 09.02 Identify safety requirements for shop organization and management.
- 09.03 Identify safety requirements for the use of industry tools and equipment.
- 09.04 Identify fire-safety procedures.
- 09.05 Identify electrical-safety precautions.

10.0 DEMONSTRATE THE PROPER USE OF INDUSTRY TOOLS AND EQUIPMENT--The student will be able to:

- 10.01 Utilize oxyacetylene welding outfit for heating, welding, brazing, and cutting.
- 10.02 Use heating devices to perform service procedures.
- 10.03 Recondition cylinders.
- 10.04 Identify general and specialized hand tools.
- 10.05 Identify and use precision measuring tools.
- 10.06 Identify and use power tools.
- 10.07 Utilize and maintain basic shop equipment.
- 10.08 Identify and use fasteners.
- 10.09 Identify gaskets and choose sealants.

11.0 DEMONSTRATE INDUSTRY-RELATED COMMUNICATION SKILLS--The student will be able to:

- 11.01 Read and interpret information in parts and service manuals and other technical media.
- 11.02 Write logical and understandable statements or phrases to accurately complete forms or invoices commonly used in business and industry.

11.03 Read and understand graphs, charts, diagrams, and tables commonly used in the motorcycle service technology industry.
11.04 Read and follow written and oral instructions.
11.05 Answer and ask questions coherently and concisely.
11.06 Read critically by recognizing assumptions and implications and by evaluating ideas.
11.07 Demonstrate appropriate telephone and face-to-face communication skills.

12.0 DEMONSTRATE INDUSTRY-RELATED MATH SKILLS--The student will be able to:

perimeter measurements for rectangles, squares, and cylinders.
12.02 Measure tolerance(s) using millimeters, inches, and metric conversions.
12.03 Add, subtract, multiply, and divide using fractions, decimals, and whole numbers.
12.04 Prepare cost estimates for jobs using service- and flat-rate standards.
12.05 Determine the correct purchase price, including sales tax, for a materials list containing a minimum of six items.
12.06 Compute required federal, state, and local taxes.

13.0 APPLY INDUSTRY-RELATED SCIENCE TO MOTORCYCLE SERVICE--The student will be able to:

13.01 Explain how molecular action caused by temperature extremes, chemical reaction, and moisture content affect motorcycle systems.
13.02 Draw conclusions or make inferences from data.
13.03 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials and know the proper precautions required for handling such materials.
13.04 Measure pressure in terms of pounds per square inch (PSI), inches of mercury, KPA, and bars and interpret results.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS AND AWARENESS OF ENTREPRENEURSHIP OPPORTUNITIES--The student will be able to:

14.01 Define and explain the differences between becoming an employee vs. becoming an entrepreneur, including the advantages, disadvantages, and risks of both.
14.02 Identify types of businesses and opportunities for employment and entrepreneurship in the motorcycle service industry.
14.03 Identify the personal characteristics and business skills necessary for becoming a successful entrepreneur.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8766120
Course Title: Motorcycle Service 2
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to the motorcycle service technology industry. These competencies include diagnosis, service, and repair of frames and suspension, wheels, tires, brakes, and drive trains. Completion of this course and the other courses in this program prepares the student for ***OCCUPATIONAL COMPLETION POINT - DATA CODE A,*** Motorcycle Mechanic--Industry Title.

01.0 DIAGNOSE, SERVICE, AND REPAIR FRAMES AND SUSPENSION--The student will be able to:

- 01.01 Identify different front- and rear-suspension systems and explain their operation.
- 01.02 Identify the parts and functions of different frames and suspension systems.
- 01.03 Service and repair front suspension.
- 01.04 Service and repair rear suspension.
- 01.05 Inspect, remove, and replace frames.
- 01.06 Install and route cables, hoses, and wiring harnesses.

02.0 DIAGNOSE, SERVICE, AND REPAIR WHEELS, TIRES, AND BRAKES--The student will be able to:

- 02.01 Explain how wheels, tires, and suspension affect chassis performance and drivability.
- 02.02 Remove, remount, and balance tires.
- 02.03 Replace and true a wheel assembly.
- 02.04 Diagnose and repair mechanical disc and drum brake systems and components.
- 02.05 Diagnose and repair hydraulic disc and drum brake systems and components.
- 02.06 Diagnose and service wheel bearings and seals.

03.0 DIAGNOSE, SERVICE, AND REPAIR DRIVE TRAINS--The student will be able to:

- 03.01 Diagnose, service, and repair chain and belt final-drive components.
- 03.02 Diagnose, service, and repair primary-drive systems.
- 03.03 Diagnose, service, and repair clutch assemblies.
- 03.04 Diagnose, service, and repair transmissions.
- 03.05 Diagnose, service, and repair shaft drives.
- 03.06 Diagnose and repair kickstart systems.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8766130
Course Title: Motorcycle Service 3
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to the motorcycle service technology industry. These competencies include diagnosis, service, and repair of fuel and exhaust systems. Completion of this course and the other courses in this program prepares the student for ***OCCUPATIONAL COMPLETION POINT - DATA CODE A, MOTORCYCLE MECHANIC--INDUSTRY TITLE.***

04.0 DIAGNOSE, SERVICE, AND REPAIR FUEL AND EXHAUST SYSTEMS--The student will be able to:

04.01 Identify components and operation of carburetion and fuel-injection systems.
04.02 Diagnose, service, and repair slide-type carburetors.
04.03 Diagnose, service, and repair constant-velocity-type (CV-type) carburetors.
04.04 Diagnose, service, and repair fixed-venturi carburetors.
04.05 Diagnose, service, and repair fuel-injection systems.
04.06 Diagnose, service, and repair exhaust systems.
04.07 Diagnose, service, and repair other fuel-delivery-system components.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8766140
Course Title: Motorcycle Service 4
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to the motorcycle service technology industry. These competencies include troubleshooting and repairing electrical system components. Completion of this course and the other courses in this program prepares the student for ***OCCUPATIONAL COMPLETION POINT - DATA CODE A, MOTORCYCLE MECHANIC--INDUSTRY*** Title.

05.0 TROUBLESHOOT AND REPAIR ELECTRICAL-SYSTEM COMPONENTS--The student will be able to:

- 05.01 Use the electrical theory to select appropriate test procedures.
- 05.02 Utilize electrical test equipment to isolate defective components.
- 05.03 Read and interpret a wiring diagram.
- 05.04 Troubleshoot and repair wiring harnesses.
- 05.05 Service and test batteries.
- 05.06 Troubleshoot and repair battery/points ignition systems.
- 05.07 Troubleshoot and repair battery-operated electronic ignition systems.
- 05.08 Troubleshoot and repair magneto-ignition systems.
- 05.09 Troubleshoot and repair capacitive-discharge-ignition (CDI) systems.
- 05.10 Troubleshoot and repair half-wave and full-wave charging systems.
- 05.11 Troubleshoot and repair three-phase charging systems.
- 05.12 Troubleshoot and repair electrical starter systems.
- 05.13 Troubleshoot and repair direct current (DC) generators.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8766150
Course Title: Motorcycle Service 5
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to the motorcycle service technology industry. These competencies include tune up of motorcycles and diagnosis, service, and repair of cooling systems. Completion of this course and the other courses in this program prepares the student for ***OCCUPATIONAL COMPLETION POINT - DATA CODE A, MOTORCYCLE*** Mechanic--Industry Title.

06.0 TUNE UP MOTORCYCLES--The student will be able to:

06.01 Diagnose drivability problems.
06.02 Adjust the cam chain tension.
06.03 Adjust the valve clearances.
06.04 Replace the ignition points, condenser, and spark plugs.
06.05 Check and set the ignition timing.
06.06 Adjust the carburetor and service the fuel-delivery systems.
06.07 Service the air-filtration systems.
06.08 Service and diagnose batteries.
06.09 Service the lubrication systems.

07.0 DIAGNOSE, SERVICE, AND REPAIR COOLING SYSTEMS--The student will be able to:

07.01 Identify the components of air and liquid cooling systems by name and function.
07.02 Diagnose, service, and repair air cooling systems.
07.03 Diagnose, service, and repair liquid cooling systems.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8766160
Course Title: Motorcycle Service 6
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to the motorcycle service technology industry. These competencies include diagnosis, repair, and reconditioning of engines together with employability and entrepreneurship activities. Completion of this course and the other courses in this program prepares the student for ***OCCUPATIONAL COMPLETION POINT - DATA CODE A, MOTORCYCLE MECHANIC--INDUSTRY TITLE.***

08.0 DIAGNOSE, REPAIR, AND RECONDITION ENGINES--The student will be able to:

08.01 Explain the engine operating theory.
08.02 Recondition a single-cylinder four-stroke engine top-end.
08.03 Recondition a multi-cylinder four-stroke engine top-end.
08.04 Recondition a two-stroke engine top-end.
08.05 Rebuild a four-stroke head.
08.06 Recondition a single-cylinder four-stroke engine bottom-end.
08.07 Recondition a multi-cylinder four-stroke engine bottom-end.
08.08 Recondition a two-stroke engine bottom-end.
08.09 Rebuild a built-up crankshaft.
08.10 Service a plain-bearing crankshaft.
08.11 Diagnose and repair electric-starter drive systems.
08.12 Diagnose and repair oil-delivery systems.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS AND AWARENESS OF ENTREPRENEURSHIP OPPORTUNITIES--The student will be able to:

14.04 Conduct a job search and secure information about a specific job.
14.05 Identify documents which may be required when applying for a job interview.
14.06 Complete a job application form correctly.
14.07 Demonstrate competence in job interview techniques.
14.08 Identify or demonstrate appropriate responses to criticism from an employer, supervisor, or other employees.
14.09 Identify work habits for successful employment.
14.10 Demonstrate health and grooming habits for successful employment.
14.11 Demonstrate a knowledge of how to make appropriate job changes.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Multi-Media Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0610.010202
Grade Level	College Credits
Length	AS Degree
Certification	

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for initial employment as multi-media managers, communications systems managers, or audio visual production managers, or to provide supplemental training for persons previously or currently employed in these occupations.

The content should include, but not be limited to, the learning of management skills permitting the graduate to oversee the operation of institutional and industrial multi-media operations. Instruction includes: production analysis, the design and production of multi-media graphics, the photographic creative process, television programming and production techniques, multi-media management and the application of production skills to solving the problems relating to the integration of multi-media. Also included are skills relating to professionalism, employability, communication, and management.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Multi-Media industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Laboratory activities are an integral part of this program with emphasis on the synthesis of disparate multi-media components into a unified presentation.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The graduating student may enroll in a Multi-Media Practicum prior to the completion of the program. The Practicum content will include resume' skills, a presentation portfolio, and the assessment of interview skills and techniques.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 9.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination. The typical length of this program for the average achieving student is an associate degree.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Differentiate between various mass communication theories.
02.0 Analyze the history, controls, ethics and responsibilities of the mass media.
03.0 Maintain multi-media equipment to industry standards.
04.0 Create projects and presentations utilizing a variety of multi-media technologies.
05.0 Demonstrate basic competency with still photography equipment.
06.0 Design and execute the photographic creative process to enhance multi-media presentations.
07.0 Design and create materials for multi-media presentations.
08.0 Generate applications of video technology as applied to multi-media presentations.
09.0 Generate applications of audio technology as applied to multi-media presentations.
10.0 Evaluate computer application for multi-media presentation needs.
11.0 Produce multi-image and multi-media programs.
12.0 Demonstrate appropriate communication skills.
13.0 Demonstrate appropriate math skills.
14.0 Demonstrate appropriate understanding of basic science.
15.0 Demonstrate employability skills.
16.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Multi-Media Technology
Secondary Number:
Postsecondary Number: 0610.010202

01.0 DIFFERENTIATE BETWEEN VARIOUS MASS COMMUNICATION THEORIES--The student will be able to:

- 01.01 Contrast the various communication media.
- 01.02 Assess the future potential of each mass media.
- 01.03 Formulate a model of communications.
- 01.04 Interpret symbol usage.
- 01.05 Identify and analyze the major characteristics of large, small and individual multi-media presentations.

02.0 ANALYZE THE HISTORY, CONTROLS, ETHICS, AND RESPONSIBILITIES OF THE MASS MEDIA--The student will be able to:

- 02.01 Describe the history of mass media.
- 02.02 Discuss the rights, responsibilities and controls of various media.
- 02.03 Evaluate the impact of various media on society.
- 02.04 Interpret ethics and discuss recent litigation involving multi-media.

03.0 MAINTAIN MULTI-MEDIA EQUIPMENT TO INDUSTRY STANDARDS--The student will be able to:

- 03.01 Demonstrate the proper care and handling of equipment used in multi-media.
- 03.02 Perform pre and post production routines for proper presentations.
- 03.03 Analyze equipment performance to meet industry standards.

04.0 CREATE PROJECTS AND PRESENTATIONS UTILIZING A VARIETY OF MULTI-MEDIA TECHNOLOGIES--The student will be able to:

- 04.01 Analyze the strengths and weaknesses of presentational media.
- 04.02 Appraise production resources to achieve desired outcomes.
- 04.03 Utilize production techniques to create the desired outcomes.
- 04.04 Adapt learned skills and generate new approaches in order to solve unique production problems.

05.0 DEMONSTRATE BASIC COMPETENCY WITH STILL PHOTOGRAPHY EQUIPMENT--The student will be able to:

- 05.01 Understand the correlation between ISO speed and emulsions of photographic film.
- 05.02 Interpret the relationship between f/stop and shutter speeds.
- 05.03 Define the photographic principles of Depth-of-Field.
- 05.04 Define the photographic principles of Fields-of-View and its relationship to focal length.
- 05.05 Distinguish the properties of various still camera formats such as 2 1/4 x 2 1/4 and 4 x 5.
- 05.06 Understand the properties of light and how to measure its intensity and color.

06.0 DESIGN AND EXECUTE THE PHOTOGRAPHIC CREATIVE PROCESS TO ENHANCE MULTI-MEDIA PRESENTATION--The student will be able to:

- 06.01 Translate the rules of art composition into still photography.
- 06.02 Apply the "elements of design" to the photographic print making process.
- 06.03 Create photographic products using accepted photographic darkroom techniques.
- 06.04 Integrate the use of photographic special effects into multi-media presentations.
- 06.05 Appraise photographic quality by accepted industry standards.

07.0 DESIGN AND CREATE MATERIALS FOR MULTI-MEDIA PRESENTATIONS--The student will be able to:

- 07.01 Develop communication skills to assess and evaluate presentation goals.
- 07.02 Evaluate multi-media resources to achieve desired outcomes.
- 07.03 Demonstrate a proficiency in computer generated graphics for multi-media.
- 07.04 Synthesize available multi-media technologies into a unified presentation(s).

08.0 GENERATE APPLICATIONS OF VIDEO TECHNOLOGY AS APPLIED TO MULTI-MEDIA PRESENTATIONS--The student will be able to:

- 08.01 Understand basic TV camera operation including Universal Focus and Depth-of-Field.
- 08.02 Organize and execute video tape recording and editing.
- 08.03 Demonstrate proficiency in assemble and insert editing techniques.
- 08.04 Perform television production and programming activities.
- 08.05 Formulate and organize a plan for video field production.
- 08.06 Design, understand and implement an audio system for video production.
- 08.07 Design understand and implement a lighting plot for video production.
- 08.08 Operate the components of a tele-conference system.

09.0 GENERATE APPLICATIONS OF AUDIO TECHNOLOGY AS APPLIED TO MULTI-MEDIA PRESENTATIONS--The student will be able to:

09.01 Evaluate production needs for microphone applications.
09.02 Demonstrate proficiency with a multi-channel audio mixer.
09.03 Generate strategies for physical and electronic audio tape editing.
09.04 Generate strategies for multi-track recordings to industry standards.
09.05 Interpreting the applications of copyright laws as they apply to prerecorded materials.

10.0 EVALUATE COMPUTER APPLICATION FOR MULTI-MEDIA PRESENTATION NEEDS--The student will be able to:

10.01 Demonstrate a basic proficiency with word processing software packages.
10.02 Design and produce a computer generated graphic.
10.03 Design and produce a computer generated desktop publication.

11.0 PRODUCE MULTI-IMAGE AND MULTI-MEDIA PROGRAMS--The student will be able to:

11.01 Assess needs of the end user.
11.02 Analyze resources available.
11.03 Create and write a script appropriate to the media selected.
11.04 Create and prepare a storyboard appropriate to the media selected.
11.05 Organize resources and manage personnel selected to implement production.
11.06 Appraise the quality and end user application of finished presentation.

12.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

12.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
12.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
12.03 Read and follow written and oral instructions.
12.04 Answer and ask questions coherently and concisely.
12.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
12.06 Demonstrate appropriate telephone/communication skills.

13.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

13.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
13.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

13.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
13.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
13.05 Demonstrate an understanding of federal, state and local taxes and their computation.

14.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

14.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
14.02 Draw conclusions or make inferences from data.
14.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
14.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

15.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

15.01 Create and write a resume'.
15.02 Prepare and compile a work portfolio.
15.03 Identify acceptable work habits.
15.04 Demonstrate competence in job interview techniques.
15.05 Formulate strategy for post graduation.
15.06 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

16.01 Define entrepreneurship.
16.02 Describe the importance of entrepreneurship to the American economy.
16.03 List the advantages and disadvantages of business ownership.
16.04 Identify the risks involved in ownership of a business.
16.05 Identify the necessary personal characteristics of a successful entrepreneur.
16.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Music Production Technology
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	N/A
	PSV
CIP Number	0650.099900
Grade Level	College Credits
Length	A.S. Degree
Certification	

I. **PURPOSE:** The purpose of this program is to prepare students for employment in music production occupations or to provide supplemental professional training for persons previously or currently employed in this field.

The content includes, but is not limited to, instruction that prepares individuals for positions such as music directors, singers, composers, and related workers (34047183).

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Music Production Technology industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Laboratory activities are an integral part of this program and include the use of multi-track recording systems, computers which will interface with these systems, audio reinforcement systems, sound mixing devices and peripheral equipment.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be used for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan signed by the student, the instructor and the employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the student's career goal. Students must receive compensation for work performed.

The typical length of this program for the average achieving student is an Associate degree.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Write, analyze, hear and interpret rhythmic, melodic and harmonic patterns in a variety of musical idioms.
02.0 Demonstrate competence in basic keyboard skills.
03.0 Demonstrate knowledge of music history and literature.
04.0 Demonstrate basic computer literacy.
05.0 Understand the operation of basic reproduction, reinforcement and recording audio equipment.
06.0 Demonstrate proficiency in a specific area of applied music.
07.0 Perform transactions with music industry suppliers.
08.0 Perform specified management skills.
09.0 Interpret, apply, use and employ knowledge of legal issues of copyright and contracts.
10.0 Demonstrate employability skills.
11.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Music Production Technology
Secondary Number:
Postsecondary Number: 0650.099900

01.0 WRITE, ANALYZE, HEAR AND INTERPRET RHYTHMIC, MELODIC AND HARMONIC PATTERNS IN A VARIETY OF MUSICAL IDIOMS--The student will be able to:

- 01.01 Demonstrate knowledge of musical calligraphy.
- 01.02 Write original melodies, chord progressions and harmonizations.
- 01.03 Analyze the style and technical content of selected written and performed music.
- 01.04 Apply listening skills for hearing live and recorded music.
- 01.05 Interpret choral and instrumental music.
- 01.06 Recall names and performance characteristics of band and orchestral instruments.

02.0 DEMONSTRATE COMPETENCE IN BASIC KEYBOARD SKILLS--The student will be able to:

- 02.01 Play scales and chord progressions in all keys.
- 02.02 Sight read selected musical examples (homophonic texture).
- 02.03 Play standard jazz progressions.
- 02.04 Harmonize melodic lines with various accompaniment patterns.
- 02.05 Play melodies by ear.
- 02.06 Improvise melodies (various idioms, styles, key centers/meters) to specified harmonic patterns.
- 02.07 Interpret and perform from a lead sheet.

03.0 DEMONSTRATE KNOWLEDGE OF MUSIC HISTORY AND LITERATURE--The student will be able to:

- 03.01 Contrast stylistic periods of compositions and performance through analysis of:
  a. Music scores
  b. Live and recorded performances
- 03.02 Recall the names and primary contributions of principal composers from the Renaissance through 20th Century.
- 03.03 Identify primary forms of music for all performing media.
- 03.04 Identify the components of musical form (motives, phrases, etc.) visually and aurally.
- 03.05 Associate particular forms of music with particular stylistic periods.
- 03.06 List the names of instruments which were prevalent in particular historical periods of music.

04.0 DEMONSTRATE BASIC COMPUTER LITERACY--The student will be able to:

04.01 Demonstrate proficiency in using MIDI instruments to record sounds using a digital sampler.
04.02 Utilize a computer and multiple MIDI instruments.
04.03 Record a single sound track; add multiple sound tracks, and change MIDI voices using the software.

05.0 UNDERSTAND THE OPERATION OF BASIC REPRODUCTION, REINFORCEMENT AND RECORDING AUDIO EQUIPMENT--The student will be able to:

05.01 Generate applications of audio technology as applied to music production.
- a. Appraise musical needs of end user.
- b. Evaluate available audio resources.
- c. Organize and create a musical script to meet end user needs.
- d. Manage personnel and technical resources for the execution of the project.
- e. Evaluate the final project for quality and appropriateness.
- f. Interpret available copy information as related to recorded music.

05.02 Formulate strategies for producing multi-track recording.
- a. Evaluate production needs for microphone applications.
- b. Demonstrate proficiency with multi-track, multi-channeled mixing consoles.
- c. Formulate strategies for physical and electronic tape editing.
- d. Formulate strategies for multi-track recording to industry standards.
- e. Configure audio recording systems for optimal and appropriate use of signal processing equipment.
- f. Develop strategies for using musical instrument digital interfacing.

05.03 Interpret multi-track recording for proper musical mix.
- a. Configure audio equipment for optimal musical mix.
- b. Create a mixing plan.
- c. Evaluate the quality of multi-track recording.
- d. Interpret musical needs for end user.
- e. Supervise equipment operator.
- f. Evaluate quality of the final mix to industry standards.

05.04 Formulate strategies for audio reinforcement of music productions.
- a. Evaluate performance needs.
- b. Evaluate technical as appropriate to given spaces.
- c. Configure a sound reinforcement system to meet performance needs.
- d. Analyze various audio qualities to achieve proper sound mix.
- e. Perform transactions with audio suppliers.
- f. Design a plot for proper microphone and speaker placement.

06.0 DEMONSTRATE PROFICIENCY IN A SPECIFIC AREA OF APPLIED MUSIC--The student will be able to:

- 06.01 Accurately sight read music at simple and moderately difficult levels.
- 06.02 Perform with stylistic accuracy as a soloist and ensemble member.
- 06.03 Improvise melodies without music or chord symbols.
- 06.04 Improvise melodies, given a specific style, meter and tempo using chord symbols.

07.0 PERFORM TRANSACTIONS WITH MUSIC INDUSTRY SUPPLIERS--The student will be able to:

- 07.01 Research sources for needed equipment, supplies and educational materials.
- 07.02 Differentiate the levels of quality in the hierarchy of manufacturers, distributors and suppliers.
- 07.03 Evaluate purchasing agreements including bids, warranties, and maintenance contracts.
- 07.04 Distinguish the variations in features between similar music related products.
- 07.05 Execute the purchase of music equipment, supplies and educational materials.

08.0 PERFORM SPECIFIED MANAGEMENT SKILLS--The student will be able to:

- 08.01 Organize scheduling for live music performances.
- 08.02 Organize scheduling for recording sessions.
- 08.03 Interpret budgets for musical events.
- 08.04 Manage live musical performances.
- 08.05 Manage music recording sessions.

09.0 INTERPRET, APPLY, USE AND EMPLOY KNOWLEDGE OF LEGAL ISSUES OF COPYRIGHT AND CONTRACTS--The student will be able to:

- 09.01 Define and implement contractual agreements with unions, agents, managers and other representatives of the commercial music production industry.
- 09.02 Evaluate and apply copyright and licensing laws.
- 09.03 Identify potential music marketing areas and manage product distribution.
- 09.04 Recognize the right of artists and employ successful negotiation of contractual agreements.

10.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 10.01 Create and write a resume.
- 10.02 Prepare and compile a work portfolio.
- 10.03 Identify acceptable work habits.
- 10.04 Demonstrate competence in job interview techniques.
- 10.05 Formulate strategy for post graduation.
- 10.06 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

11.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

11.01 Define entrepreneurship.
11.02 Describe the importance of entrepreneurship to the American economy.
11.03 List the advantages and disadvantages of business ownership.
11.04 Identify the risks involved in ownership of a business.
11.05 Identify the necessary personal characteristics of a successful entrepreneur.
11.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Occupational Safety and Health Technology
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I150701**
CIP Number	0615.070100
Grade Level	30, 31
Length	40 hours
Certification	OSHA @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this course is to prepare students to meet safety and health requirements for employment.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, state and federal safety and workplace health legislation and standards, hazard recognition and avoidance, workplace analysis/safety inspections, and preparation and interpretation of technical reports and data.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Occupational Safety and Health industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this course and provides instruction in workplace hazard recognition, equipment use, safety inspections, and developing costs analyses for corrective actions.

III. **SPECIAL NOTE:** The typical length of this course for the average achieving student is 40 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate working knowledge of the Occupational Safety and Health Act and standards that relate to a specific industry.
02.0 Deliver safety instruction effectively.
03.0 Demonstrate an understanding of employer/employee relationships to develop and maintain a safe working environment.
04.0 Recognize workplace hazards and corrective action to take.
05.0 Orient new workers to their jobs so they work in an efficient and safe manner.

06.0 Develop a safety-training plan for a work site.
07.0 Complete a job safety analysis.
08.0 Conduct a workplace safety analysis and write a plan for corrective action.
09.0 Prepare, analyze, and evaluate technical data.
10.0 Develop or modify a safety program.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Occupational Safety and Health Technology
Secondary Number:
Postsecondary Number: I150701

01.0 DEMONSTRATE A WORKING KNOWLEDGE OF THE OCCUPATIONAL SAFETY AND HEALTH ACT AND STANDARDS THAT RELATE TO A SPECIFIC INDUSTRY--The student will be able to:

- 01.01 Explain how Congressional action becomes regulation.
- 01.02 Locate standards for theoretical situations, using a regulation book.

02.0 DELIVER SAFETY INSTRUCTION EFFECTIVELY--The student will be able to:

- 02.01 Using acceptable teaching/training methods, conduct a safety training session.
- 02.02 Develop and use a pre-test and post-test.

03.0 DEMONSTRATE AN UNDERSTANDING OF EMPLOYER/EMPLOYEE RELATIONSHIPS TO DEVELOP AND MAINTAIN A SAFE WORKING ENVIRONMENT--The student will be able to:

- 03.01 Explain how to organize a safety committee.
- 03.02 Explain the purpose and function of a safety committee.
- 03.03 Develop an incentive program for a company.
- 03.04 Explain how unions or employee organizations impact on work procedures and safety.
- 03.05 Demonstrate an understanding of the Florida "Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

04.0 RECOGNIZE WORK PLACE HAZARDS AND CORRECTIVE ACTION TO TAKE--The student will be able to:

- 04.01 Identify work place hazards and specify corrective action to be taken.
- 04.02 Identify potential hazards and explain worker behavior around the hazards.

05.0 ORIENT NEW WORKERS TO THEIR JOBS SO THEY WILL WORK IN AN EFFICIENT AND SAFE MANNER--The student will be able to:

- 05.01 Explain the importance of properly trained workers, especially in hazardous occupations.
- 05.02 Develop an outline to use in training workers to do their jobs safely and efficiently.
- 05.03 Develop a job related pre-test and post-test.

06.0 DEVELOP A SAFETY-TRAINING PLAN FOR A WORK SITE--The student will be able to:

06.01 Identify job skills or tasks required of different occupations or positions in a work place.
06.02 Develop training activities for identified skills that will reduce or eliminate injuries.

07.0 COMPLETE A JOB SAFETY ANALYSIS--The student will be able to:

07.01 Explain the purpose of a job safety analysis (JSA).
07.02 Conduct a JSA on the activities of a specific worker in a specific industry.

08.0 CONDUCT A WORK PLACE SAFETY ANALYSIS AND WRITE A PLAN FOR CORRECTIVE ACTION--The student will be able to:

08.01 Perform a work place inspection using Occupational Safety and Health Administration (OSHA) Standards.
08.02 Cite specific regulations and standards for items not in compliance during a safety inspection.
08.03 Develop a written plan of alternative solutions or corrective actions with appropriate cost and cost benefit statements.

09.0 PREPARE, ANALYZE AND EVALUATE TECHNICAL DATA--The student will be able to:

09.01 Prepare cost and cost benefit statements for specific corrective actions.
09.02 Analyze and explain accident incidence statistics.

10.0 DEVELOP OR MODIFY A SAFETY PROGRAM--The student will be able to:

10.01 Develop a safety program, given a specific work place situation.
10.02 Modify an existing training program to reflect new circumstances, i.e. new work place hazards.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Office Machine Maintenance
Occupational Area:	Industrial Education
	Secondary
Program Numbers	**8715000**
CIP Number	0647.010201
Grade Level	9-12, 30, 31
Length	6 credits
Certification	BUS MACH @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as office machine servicer apprentices (85926659), (633.281-022).

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and knowledge of tasks and equipment used in office machine maintenance.

Listed below are the courses that comprise this program when offered at the secondary level:

8715010 - Office Machine Maintenance 1
8715020 - Office Machine Maintenance 2
8715030 - Office Machine Maintenance 3
8715040 - Office Machine Maintenance 4
8715050 - Office Machine Maintenance 5
8715060 - Office Machine Maintenance 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Office Machine industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Office machine maintenance laboratory hands-on activities are an integral part of this program. The tools, equipment, material and processes used in the laboratory are similar to those used in business and industry.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

Algebra is recommended as a prerequisite for entry into this program. Students should not be color blind.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

The particular outcomes and student performance standards which the handicapped student must master to earn credit must be specified in the student's Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Analyze all phases of DC circuits related to office machine maintenance.
02.0 Demonstrate a knowledge of and practice all laboratory procedures related to office machine maintenance.
03.0 Troubleshoot and maintain electronic typewriters.
04.0 Troubleshoot and maintain electromechanical typewriters.
05.0 Troubleshoot and maintain electronic printing calculators.
06.0 Demonstrate appropriate communication skills.
07.0 Demonstrate appropriate math skills.
08.0 Demonstrate appropriate understanding of basic science.
09.0 Demonstrate employability skills.
10.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Office Machine Maintenance
Secondary Number: 8715000
Postsecondary Number:

01.0 ANALYZE ALL PHASES OF D.C. CIRCUITS RELATED TO OFFICE MACHINE MAINTENANCE--The student will be able to:

01.01 Solve basic algebraic problems as applicable to electronics (program prerequisite).
01.02 Relate electricity to nature of matter.
01.03 Identify sources of electricity.
01.04 Define voltage, current, resistance, power, and energy.
01.05 Apply and relate Ohms Law.
01.06 Read and interpret color codes to identify resistors.
01.07 Measure properties of a circuit using VOM and DVM meters.
01.08 Compute and measure conductance and resistance of conductors and insulators.
01.09 Analyze series circuits.
01.10 Construct series circuits.
01.11 Troubleshoot series-parallel circuits.
01.12 Analyze parallel circuits.
01.13 Construct parallel circuits.
01.14 Troubleshoot parallel circuits.
01.15 Construct series-parallel circuits.
01.16 Analyze voltage dividers (loaded and unloaded).
01.17 Construct voltage dividers (loaded and unloaded).
01.18 Troubleshoot voltage dividers (loaded and unloaded).
01.19 Solve network theorem problems using Kirchhoff, (V & I), Thevenin, Norton, Superposition, and Delta-Wye.
01.20 Analyze maximum power transfer theory.
01.21 Construct maximum power transfer theory.
01.22 Troubleshoot maximum power transfer theory.
01.23 Define magnetic properties of circuits and devices.
01.24 Determine physical and electrical.
01.25 Analyze and measure RL and RD time constants.
01.26 Set up and operate VOM for DC circuits.
01.27 Set up and operate DVM for DC circuits.
01.28 Set up and operate power supplies for DC circuits.
01.29 Set up and operate oscilloscopes for DC circuits.

02.0 DEMONSTRATE A KNOWLEDGE OF AND PRACTICE ALL LABORATORY PROCEDURES RELATED TO OFFICE MACHINE MAINTENANCE--The student will be able to:

02.01 Apply proper safety standards.
02.02 Make electrical connections.
02.03 Identify and use hand tools properly.
02.04 Identify and use power tools properly.
02.05 Handle static sensitive devices.
02.06 Identify and use fasteners (screws, washers, pins, connectors).
02.07 Establish and maintain an effective inventory control system.

02.08 Establish and maintain an effective parts control system for use in laboratory and maintenance vehicles.
02.09 Solder using proper soldering techniques.
02.10 Set up and operate scales.
02.11 Set up and operate micrometers.
02.12 Set up and operate rules.
02.13 Set up and operate drill blocks.
02.14 Set up and operate dial indicators.
02.15 Set up and operate vernier scales.
02.16 Set up and operate mechanical and optical measuring devices.
02.17 Set up and operate height gauges.
02.18 Set up and operate depth gauges.
02.19 Read and convert measurements.
02.20 Perform preventative maintenance according to vendor specifications.
02.21 Develop and implement preventative maintenance schedules.

03.0 TROUBLESHOOT AND MAINTAIN ELECTRONIC TYPEWRITERS--The student will be able to:

03.01 Read and interpret schematic and block diagrams of electronic typewriters.
03.02 Determine the defective status of keyboards.
03.03 Troubleshoot keyboards.
03.04 Remove and replace keyboards or components.
03.05 Perform operating systems check and make minor adjustments to keyboards.
03.06 Perform preventive maintenance on keyboards.
03.07 Determine the defective status of logic boards.
03.08 Troubleshoot logic boards.
03.09 Remove and replace logic boards of components.
03.10 Perform operating systems check and make minor adjustments to logic boards.
03.11 Perform preventive maintenance on logic boards.
03.12 Determine the defective status of printing carriers.
03.13 Troubleshoot printing carriers.
03.14 Remove and replace printing carriers or components.
03.15 Perform operating systems check and make minor adjustments to printing carriers.
03.16 Perform preventive maintenance on printing carriers.
03.17 Determine the defective status of power supplies.
03.18 Troubleshoot power supplies.
03.19 Remove and replace power supplies or components.
03.20 Perform operating systems check and make minor adjustments to power supplies.
03.21 Perform preventive maintenance on power supplies.

04.0 TROUBLESHOOT AND MAINTAIN ELECTROMECHANICAL TYPEWRITERS--The student will be able to:

04.01 Read and interpret schematic and block diagrams of electromechanical typewriters.
04.02 Determine the defective status of escapement mechanisms.
04.03 Troubleshoot escapement mechanisms.
04.04 Remove and replace escapement mechanisms or components.
04.05 Perform operating systems check and make minor adjustments to escapement mechanisms.
04.06 Perform preventive maintenance on escapement mechanisms.
04.07 Determine the defective status of keyboards.
04.08 Troubleshoot keyboards.
04.09 Remove and replace keyboards or components.
04.10 Perform operating systems check and make minor adjustments to keyboards.
04.11 Perform preventive maintenance on keyboards.
04.12 Determine the defective status of printing carriers.
04.13 Troubleshoot printing carriers.
04.14 Remove and replace printing carriers or components.
04.15 Perform operating systems check and make minor adjustment to printing carriers.
04.16 Perform preventive maintenance on printing carriers.
04.17 Determine the defective status of cycle clutch drives including motor.
04.18 Troubleshoot cycle clutch drives including motor.
04.19 Remove and replace cycle clutch drives including motor or components.
04.20 Perform operating systems check and make minor adjustments to cycle clutch drives including motor.
04.21 Perform preventive maintenance on cycle clutch drives including motor.
04.22 Determine the defective status of op-cam shafts.
04.23 Troubleshoot op-cam shafts.
04.24 Remove and replace op-cam shafts or components.
04.25 Perform operating systems check and make minor adjustments to op-cam shafts.
04.26 Perform preventive maintenance on op-cam shafts.

05.0 TROUBLESHOOT AND MAINTAIN ELECTRONIC PRINTING CALCULATORS--The student will be able to:

05.01 Read and interpret schematic and block diagrams on electronic printing calculators.
05.02 Determine the defective status of power supplies.
05.03 Troubleshoot power supplies.
05.04 Remove and replace power supplies or components.
05.05 Perform operating systems check and make minor adjustments to power supplies.
05.06 Perform preventive maintenance on power supplies.
05.07 Determine defective status of printing carriers.
05.08 Troubleshoot printing carriers.
05.09 Remove and replace printing carriers or components.

05.10 Perform operating systems check and make minor adjustments to printing carriers.
05.11 Perform preventive maintenance on printing carriers.
05.12 Determine defective status of logic boards.
05.13 Troubleshoot logic boards.
05.14 Remove and replace logic boards or components.
05.15 Perform operating systems check and make minor adjustments to logic boards.
05.16 Perform preventive maintenance on logic boards.
05.17 Determine defective status of keyboards.
05.18 Troubleshoot keyboards.
05.19 Remove and replace keyboards or components.
05.20 Perform operating systems check and make minor adjustments to keyboards.
05.21 Perform preventive maintenance on keyboards.

06.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

06.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
06.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
06.03 Read and follow written and oral instructions.
06.04 Answer and ask questions coherently and concisely.
06.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
06.06 Demonstrate appropriate telephone/communication skills.

07.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

07.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
07.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
07.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
07.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
07.05 Demonstrate an understanding of federal, state and local taxes and their computation.

08.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

08.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
08.02 Draw conclusions or make inferences from data.
08.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
08.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

09.01 Conduct a job search.
09.02 Secure information about a job.
09.03 Identify documents which may be required when applying for a job interview.
09.04 Complete a job application form correctly.
09.05 Demonstrate competence in job interview techniques.
09.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
09.07 Identify acceptable work habits.
09.08 Demonstrate knowledge of how to make appropriate job changes.
09.09 Demonstrate acceptable employee health habits.
09.10 Demonstrate an understanding of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

10.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

10.01 Define entrepreneurship.
10.02 Describe the importance of entrepreneurship to the American economy.
10.03 List the advantages and disadvantages of business ownership.
10.04 Identify the risks involved in ownership of a business.
10.05 Identify the necessary personal characteristics of a successful entrepreneur.
10.06 Identify the business skills needed to operate a small business efficiently and effectively.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8715010
Course Title: Office Machine Maintenance 1
Course Credit: 1

COURSE DESCRIPTION:

This course will provide instruction and shop/lab experience in safety procedures, power/hand tool use and measuring.

01.0 ANALYZE ALL PHASES OF D.C. CIRCUITS RELATED TO OFFICE MACHINE MAINTENANCE--The student will be able to:

- 01.09 Analyze series circuits.
- 01.10 Construct series circuits.
- 01.11 Troubleshoot series-parallel circuits.
- 01.12 Analyze parallel circuits.
- 01.13 Construct parallel circuits.
- 01.14 Troubleshoot parallel circuits.
- 01.15 Construct series-parallel circuits.
- 01.16 Analyze voltage dividers (loaded and unloaded).
- 01.17 Construct voltage dividers (loaded and unloaded).
- 01.18 Troubleshoot voltage dividers (loaded and unloaded).
- 01.19 Solve network theorem problems using Kirchhoff, (V & I), Thevenin, Norton, Superposition, and Delta-Wye.
- 01.20 Analyze maximum power transfer theory.
- 01.21 Construct maximum power transfer theory.
- 01.22 Troubleshoot maximum power transfer theory.
- 01.23 Define magnetic properties of circuits and devices.
- 01.24 Determine physical and electrical.
- 01.25 Analyze and measure RL and RD time constants.
- 01.26 Set up and operate VOM for DC circuits.
- 01.27 Set up and operate DVM for DC circuits.
- 01.28 Set up and operate power supplies for DC circuits.
- 01.29 Set up and operate oscilloscopes for DC circuits.

02.0 DEMONSTRATE A KNOWLEDGE OF AND PRACTICE ALL LABORATORY PROCEDURES RELATED TO OFFICE MACHINE MAINTENANCE--The student will be able to:

- 02.01 Apply proper safety standards.
- 02.02 Make electrical connections.
- 02.03 Identify and use hand tools properly.
- 02.04 Identify and use power tools properly.
- 02.05 Handle static sensitive devices.
- 02.06 Identify and use fasteners (screws, washers, pins, connectors).
- 02.07 Establish and maintain an effective inventory control system.
- 02.08 Establish and maintain an effective parts control system for use in laboratory and maintenance vehicles.
- 02.09 Solder using proper soldering techniques.
- 02.10 Set up and operate scales.

02.11 Set up and operate micrometers.
02.12 Set up and operate rules.
02.13 Set up and operate drill blocks.
02.14 Set up and operate dial indicators.
02.15 Set up and operate vernier scales.
02.16 Set up and operate mechanical and optical measuring devices.
02.17 Set up and operate height gauges.
02.18 Set up and operate depth gauges.
02.19 Read and convert measurements.
02.20 Perform preventative maintenance according to vendor specifications.
02.21 Develop and implement preventative maintenance schedules.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8715020
Course Title: Office Machine Maintenance 2
Course Credit: 1

COURSE DESCRIPTION:

This course will provide instruction and shop/lab experience in D.C. circuits as related to office machines.

01.0 ANALYZE ALL PHASES OF D.C. CIRCUITS RELATED TO OFFICE MACHINE MAINTENANCE--The student will be able to:

- 01.01 Solve basic algebraic problems as applicable to electronics (program prerequisite).
- 01.02 Relate electricity to nature of matter.
- 01.03 Identify sources of electricity.
- 01.04 Define voltage, current, resistance, power, and energy.
- 01.05 Apply and relate Ohms Law.
- 01.06 Read and interpret color codes to identify resistors.
- 01.07 Measure properties of a circuit using VOM and DVM meters.
- 01.08 Compute and measure conductance and resistance of conductors and insulators.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8715030
Course Title: Office Machine Maintenance 3
Course Credit: 1

COURSE DESCRIPTION:

This course will provide instruction and shop/lab experiences in troubleshooting and maintaining electronic typewriters.

03.0 TROUBLESHOOT AND MAINTAIN ELECTRONIC TYPEWRITERS--The student will be able to:

- 03.01 Read and interpret schematic and block diagrams of electronic typewriters.
- 03.02 Determine the defective status of keyboards.
- 03.03 Troubleshoot keyboards.
- 03.04 Remove and replace keyboards or components.
- 03.05 Perform operating systems check and make minor adjustments to keyboards.
- 03.06 Perform preventive maintenance on keyboards.
- 03.07 Determine the defective status of logic boards.
- 03.08 Troubleshoot logic boards.
- 03.09 Remove and replace logic boards of components.
- 03.10 Perform operating systems check and make minor adjustments to logic boards.
- 03.11 Perform preventive maintenance on logic boards.
- 03.12 Determine the defective status of printing carriers.
- 03.13 Troubleshoot printing carriers.
- 03.14 Remove and replace printing carriers or components.
- 03.15 Perform operating systems check and make minor adjustments to printing carriers.
- 03.16 Perform preventive maintenance on printing carriers.
- 03.17 Determine the defective status of power supplies.
- 03.18 Troubleshoot power supplies.
- 03.19 Remove and replace power supplies or components.
- 03.20 Perform operating systems check and make minor adjustments to power supplies.
- 03.21 Perform preventive maintenance on power supplies.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8715040
Course Title: Office Machine Maintenance 4
Course Credit: 1

COURSE DESCRIPTION:

This course will provide instruction and shop/lab experience in troubleshooting and maintaining electromechanical typewriters.

04.0 TROUBLESHOOT AND MAINTAIN ELECTROMECHANICAL TYPEWRITERS--The student will be able to:

- 04.01 Read and interpret schematic and block diagrams of electromechanical typewriters.
- 04.02 Determine the defective status of escapement mechanisms.
- 04.03 Troubleshoot escapement mechanisms.
- 04.04 Remove and replace escapement mechanisms or components.
- 04.05 Perform operating systems check and make minor adjustments to escapement mechanisms.
- 04.06 Perform preventive maintenance on escapement mechanisms.
- 04.07 Determine the defective status of keyboards.
- 04.08 Troubleshoot keyboards.
- 04.09 Remove and replace keyboards or components.
- 04.10 Perform operating systems check and make minor adjustments to keyboards.
- 04.11 Perform preventive maintenance on keyboards.
- 04.12 Determine the defective status of printing carriers.
- 04.13 Troubleshoot printing carriers.
- 04.14 Remove and replace printing carriers or components.
- 04.15 Perform operating systems check and make minor adjustment to printing carriers.
- 04.16 Perform preventive maintenance on printing carriers.
- 04.17 Determine the defective status of cycle clutch drives including motor.
- 04.18 Troubleshoot cycle clutch drives including motor.
- 04.19 Remove and replace cycle clutch drives including motor or components.
- 04.20 Perform operating systems check and make minor adjustments to cycle clutch drives including motor.
- 04.21 Perform preventive maintenance on cycle clutch drives including motor.
- 04.22 Determine the defective status of op-cam shafts.
- 04.23 Troubleshoot op-cam shafts.
- 04.24 Remove and replace op-cam shafts or components.
- 04.25 Perform operating systems check and make minor adjustments to op-cam shafts.
- 04.26 Perform preventive maintenance on op-cam shafts.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8715050
Course Title: Office Machine Maintenance 5
Course Credit: 1

COURSE DESCRIPTION:

This course will provide instruction and shop/lab experience in troubleshooting and maintaining electronic printing calculators.

05.0 TROUBLESHOOT AND MAINTAIN ELECTRONIC PRINTING CALCULATORS--The student will be able to:

- 05.01 Read and interpret schematic and block diagrams on electronic printing calculators.
- 05.02 Determine the defective status of power supplies.
- 05.03 Troubleshoot power supplies.
- 05.04 Remove and replace power supplies or components.
- 05.05 Perform operating systems check and make minor adjustments to power supplies.
- 05.06 Perform preventive maintenance on power supplies.
- 05.07 Determine defective status of printing carriers.
- 05.08 Troubleshoot printing carriers.
- 05.09 Remove and replace printing carriers or components.
- 05.10 Perform operating systems check and make minor adjustments to printing carriers.
- 05.11 Perform preventive maintenance on printing carriers.
- 05.12 Determine defective status of logic boards.
- 05.13 Troubleshoot logic boards.
- 05.14 Remove and replace logic boards or components.
- 05.15 Perform operating systems check and make minor adjustments to logic boards.
- 05.16 Perform preventive maintenance on logic boards.
- 05.17 Determine defective status of keyboards.
- 05.18 Troubleshoot keyboards.
- 05.19 Remove and replace keyboards or components.
- 05.20 Perform operating systems check and make minor adjustments to keyboards.
- 05.21 Perform preventive maintenance on keyboards.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8715060
Course Title: Office Machine Maintenance 6
Course Credit: 1

COURSE DESCRIPTION:

This course will provide instruction and lab experience with employability skills.

06.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 06.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 06.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 06.03 Read and follow written and oral instructions.
- 06.04 Answer and ask questions coherently and concisely.
- 06.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 06.06 Demonstrate appropriate telephone/communication skills.

07.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 07.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 07.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 07.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 07.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 07.05 Demonstrate an understanding of federal, state and local taxes and their computation.

08.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 08.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 08.02 Draw conclusions or make inferences from data.
- 08.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 08.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

09.01 Conduct a job search.
09.02 Secure information about a job.
09.03 Identify documents which may be required when applying for a job interview.
09.04 Complete a job application form correctly.
09.05 Demonstrate competence in job interview techniques.
09.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
09.07 Identify acceptable work habits.
09.08 Demonstrate knowledge of how to make appropriate job changes.
09.09 Demonstrate acceptable employee health habits.
09.10 Demonstrate an understanding of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

10.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

10.01 Define entrepreneurship.
10.02 Describe the importance of entrepreneurship to the American economy.
10.03 List the advantages and disadvantages of business ownership.
10.04 Identify the risks involved in ownership of a business.
10.05 Identify the necessary personal characteristics of a successful entrepreneur.
10.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Optical Technology
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	N/A
	PSAV
Program Numbers	**I150606**
CIP Number	0615.060600
Grade Level	30, 31
Length	1440 Hours
Certification	TEC MECH ¶7 ¶G
	TECH CHEM ¶7 ¶G
	TEC OPTICS @7 G
Facility Code	244
VSO	VICA
Coop Method	Yes
Apprenticeship	No

I. **PURPOSE:** The purpose of this program is to prepare students for employment as optical goods worker (89917756) or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, anatomy and physiology of the eye, lens forming and fabricating, developing the skill in performing the manipulative technique required in the practice of ophthalmic technology.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the optical industry; planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in a laboratory setting using hands-on experiences uses glass and plastic lens, implements and equipment appropriate to the programs content in accordance with current practices in the trade.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects

equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 7.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1440 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
OPTICAL GOODS WORKER - OES 89917756

01.0 Demonstrate understanding of ophthalmic technology procedures.
02.0 Define terminologies relating to ophthalmic technology.
03.0 Identify lenses and prescriptions.
04.0 Perform math for prescription lens.
05.0 Use and care for hand tools.
06.0 Use charts and manuals.
07.0 Demonstrate understanding of lens surfacing lab procedures.
08.0 Grind bifocal lenses.
09.0 Grind special type lenses.
10.0 Grind prism in all types of lenses.
11.0 Grind prescription lenses.
12.0 Demonstrate understanding of finishing lab procedures.
13.0 Fabricate all types of lenses into frames.
14.0 Demonstrate special types edges lenses.
15.0 Grind and fabricate all types of lenses.
16.0 Demonstrate understanding of procedures for plastics lens labs.
17.0 Grind and fabricate plastic single vision lenses.
18.0 Grind and fabricate plastic bifocal lenses.

19.0 Dye all types of plastic lenses.
20.0 Maintain optical equipment.
21.0 Demonstrate appropriate communication skills.
22.0 Demonstrate appropriate math skills.
23.0 Demonstrate appropriate understanding of basic science.
24.0 Demonstrate employability skills.
25.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Optical Technology
Secondary Number:
Postsecondary Number: I150606

OCCUPATIONAL COMPLETION POINT - DATA CODE A
OPTICAL GOODS WORKER - OES 89917756

01.0 DEMONSTRATE UNDERSTANDING OF OPHTHALMIC TECHNOLOGY PROCEDURES--The student will be able to:

- 01.01 Identify philosophy, job description, job station.
- 01.02 Clean ophthalmic lab.
- 01.03 Explain history of glass and plastic.

02.0 DEFINE TERMINOLOGIES RELATING TO OPHTHALMIC TECHNOLOGY--The student will be able to:

- 02.01 Demonstrate theory of light RX.
- 02.02 Measure with metric system.
- 02.03 Explain index of refraction and reflection.
- 02.04 Identify terminology.
- 02.05 Identify anatomy and physiology of the eye.

03.0 IDENTIFY LENSES AND PRESCRIPTIONS--The student will be able to:

- 03.01 Identify types of single vision lenses.
- 03.02 Identify types of bifocal lenses.
- 03.03 Identify the diopter system.
- 03.04 Analyze doctor's prescription.

04.0 PERFORM MATH FOR PRESCRIPTION LENS--The student will be able to:

- 04.01 Transpose prescription.
- 04.02 Calculate curves to be ground on lenses.
- 04.03 Calculate thickness for lens.
- 04.04 Calculate decentration for lens.
- 04.05 Calculate prism for lens.
- 04.06 Combine RX elements.

05.0 USE AND CARE FOR HAND TOOLS--The student will be able to:

- 05.01 Read a Lensometer.
- 05.02 Read lens clock and thickness calipers.
- 05.03 Read brass gauges.
- 05.04 Explain the ANSI Z80-1 1972 standards.

06.0 USE CHARTS AND MANUALS--The student will be able to:

- 06.01 Read Base Curve Selection chart.
- 06.02 Write job tickets.

06.03 Measure with P.D. Ruler, frame and parts.
06.04 Take vertex power test.
06.05 Describe lab safety procedure.
06.06 List procedures for entering surface lab.

07.0 DEMONSTRATE UNDERSTANDING OF LENS SURFACING LAB PROCEDURES--The student will be able to:

07.01 Complete all test-Orientation in surface lab.
07.02 Maintain and clean surface machines daily.
07.03 Grind 4 pair single vision lenses + and - side.

08.0 GRIND BIFOCAL LENSES--The student will be able to:

08.01 Grind 6 pair kryptok lens, sphere and cylinder - side.
08.02 Grind 4 pair flat top lens, sphere and cylinder - side.
08.03 Grind 2 pair curve top lenses - side.
08.04 Grind 2 pair single vision plus cylinder - side.
08.05 Grind 4 pair executive lenses minus side.

09.0 GRIND SPECIAL TYPE LENSES--The student will be able to:

09.01 Grind 2 lens above range of generator on - side.
09.02 Grind 2 pair lenses below - 300 diopter on generator.
09.03 Grind 2 pair myo-disc lenses on minus side.
09.04 Grind 2 pair photo gray lenses.
09.05 Grind 4 pair invisible bifocal lenses.

10.0 GRIND PRISM IN ALL TYPES OF LENSES--The student will be able to:

10.01 Grind 7 pair lenses with prism on all type bifocals.
10.02 Grind 3 pair special type bifocals.
10.03 Grind 4 pair ultex lenses on plus side.

11.0 GRIND PRESCRIPTION LENSES--The student will be able to:

11.01 Cut 6 sphere & cylinder laps.
11.02 Grind 3 pair lens as Post-Test.
11.03 Account for breakage.

12.0 DEMONSTRATE UNDERSTANDING OF FINISHING LAB PROCEDURES--The student will be able to:

12.01 Perform procedures for entering finish lab.
12.02 Clean and maintain machines daily.
12.03 Perform hand beveling on ceramic & diamond wheels.
12.04 Mount lenses into frame (metal & plastic).
12.05 Make patterns.

13.0 FABRICATE ALL TYPES OF LENSES INTO FRAMES--The student will be able to:

13.01 Fabricate glasses using 2 S.V. sphere lens.
13.02 Fabricate glasses using S.V. vision + and - lens.
13.03 Fabricate glasses using 2 kryptok bifocal S.V.

13.04 Fabricate glasses using kryptok bifocal cylinder lens.
13.05 Fabricate glasses using 2 flat top bifocal sphere lens.
13.06 Fabricate glasses using flat top bifocal cylinder lens.
13.07 Fabricate glasses using 2 executive bifocal sphere lens.
13.08 Fabricate glasses using executive bifocal cylinder lens.
13.09 Fabricate glasses using dryptok cylinder lens.
13.10 Fabricate glasses using flat top cylinder lens.
13.11 Fabricate glasses using executive cylinder lens.

14.0 DEMONSTRATE SPECIAL TYPES EDGES ON LENSES--The student will be able to:

14.01 Fabricate glasses using high minus lenses.
14.02 Fabricate glasses using high plus lenses.
14.03 Block lenses for edging using alloy blocker.
14.04 Demonstrate hide-a-bevel.
14.05 Fabricate rimless glasses.
14.06 Fabricate Ultex Spheres.
14.07 Fabricate Ultex Cylinders.
14.08 Fabricate 4 pair glass S.V. lens into frames.
14.09 Account for breakage.
14.10 Fabricate Logo Frames.

15.0 GRIND AND FABRICATE ALL TYPES OF LENSES--The student will be able to:

15.01 Grind and fabricate single vision blanks.
15.02 Grind and fabricate semi-finished - cylinder blanks.
15.03 Grind and fabricate semi-finished + blanks.
15.04 Grind and fabricate semi-finished cylinder blanks.
15.05 Grind and fabricate semi-finished flat top bifocals.
15.06 Grind and fabricate semi-finished kryptok bifocals.
15.07 Grind and fabricate semi-finished curve top bifocals.
15.08 Grind and fabricate compound prism bifocals.
15.09 Grind and fabricate semi-finished oversize blanks.
15.10 Grind and fabricate semi-finished trifocals.
15.11 Grind and fabricate semi-finished occupational bifocal.
15.12 Grind and fabricate semi-finished Ex. bifocal.
15.13 Account for breakage.
15.14 Align frames.
15.15 Fabricate 4 pair glass lens into cylinder frame.
15.16 Fabricate 4 pair bifocal lens into metal frame.

16.0 DEMONSTRATE UNDERSTANDING OF PROCEDURES FOR PLASTIC LENS LAB--The student will be able to:

16.01 Complete all job tickets-orientation of plastic lens lab.
16.02 Clean and maintain machines daily.
16.03 Demonstrate Sag-Dial and Computer.

17.0 GRIND AND FABRICATE PLASTIC SINGLE VISION LENSES--The student will be able to:

17.01 Grind 2 pair S.V. sphere.
17.02 Grind 2 pair S.V. cylinder.
17.03 Fabricate 4 pair S.V. lens.

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17.04 Grind and fabricate 2 pair S.V. high cylinder.

18.0 GRIND AND FABRICATE PLASTIC BIFOCAL LENSES--The student will be able to:

18.01 Grind and fabricate 3 pair kryptok.
18.02 Grind and fabricate 3 pair flat top.
18.03 Grind and fabricate 2 pair special type bifocal.
18.04 Grind and fabricate 4 pair executive bifocals.

19.0 DYE ALL TYPES OF PLASTIC LENSES--The student will be able to:

19.01 Dye plastic lens - 6 pairs.
19.02 Account for breakage.
19.03 Fabricate 4 pair plastic lens plastic frame.
19.04 Fabricate 4 pair plastic lens metal frame.

20.0 MAINTAIN OPTICAL EQUIPMENT--The student will be able to:

20.01 Clean tanks and edgers.
20.02 Check size and axis of edgers.
20.03 Change generator tanks.
20.04 Check generator curve thickness and prism.
20.05 Clean hand stone, tanks and sponges.
20.06 Clean and fix reclaim tanks.
20.07 Remove and replace air filters in all labs.

21.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

21.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
21.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
21.03 Read and follow written and oral instructions.
21.04 Answer and ask questions coherently and concisely.
21.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
21.06 Demonstrate appropriate telephone/communication skills.

22.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

22.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
22.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
22.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
22.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
22.05 Demonstrate an understanding of federal, state and local taxes and their computation.

23.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

23.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
23.02 Draw conclusions or make inferences from data.
23.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
23.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

24.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

24.01 Conduct a job search.
24.02 Secure information about a job.
24.03 Identify documents which may be required when applying for a job interview.
24.04 Complete a job application form correctly.
24.05 Demonstrate competence in job interview techniques.
24.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
24.07 Identify acceptable work habits.
24.08 Demonstrate knowledge of how to make job changes appropriately.
24.09 Demonstrate acceptable employee health habits.
24.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

25.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

25.01 Define entrepreneurship.
25.02 Describe the importance of entrepreneurship to the American economy.
25.03 List the advantages and disadvantages of business ownership.
25.04 Identify the risks involved in ownership of a business.
25.05 Identify the necessary personal characteristics of a successful entrepreneur.
25.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Painting and Decorating
Occupational Area: Industrial Education

	Secondary	PSAV
Program Numbers	**8721500**	**I460408**
CIP Number	0646.040800	0646.040800
Grade Level	9-12, 30, 31	30, 31
Length	4 credits	600 hours
Certification	TEC CONSTR ¶7 ¶G PAINTING @7 G BLDG CONST ¶7 ¶G	TEC CONSTR ¶7 ¶G PAINTING @7 G BLDG CONST ¶7 ¶G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as painters and paper hangers (87402563), painters (840.381-010), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, materials and cost estimates, surface preparation, paint mixing and matching, application procedures, special effects, wall covering application, blueprint reading, ladder and scaffold erection and use, selection, application and care of materials, use of hand and power tools, and use of current industry standards, practices and techniques.

Listed below are the courses that comprise this program when offered at the secondary level:

8721510 - Painting and Decorating 1
8721520 - Painting and Decorating 2
8721530 - Painting and Decorating 3
8721540 - Painting and Decorating 4

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Painting and Decorating industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in preparation of surfaces, application of coatings and coverings, scaffold and ladder erection, mixing and matching paints and application of wallpaper.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such

organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 8.0, Language 8.0, Reading 8.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

When this program is offered at the postsecondary level it may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 600 hours.

The particular outcomes and student performance standards which the handicapped student must master to earn credit must be specified in the student's Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate the ability to work safely.
02.0 Select, use, and care for tools and equipment, scaffolding and ladders.
03.0 Demonstrate proficiency in the preparation of surfaces.
04.0 Demonstrate the use of the materials used in painting.
05.0 Demonstrate proper application of materials used in painting using brushes, rollers and sprayers
06.0 Fit and apply wallpaper.
07.0 Mix colors and match samples.
08.0 Apply stains, varnishes, lacquers and acrylics.
09.0 Use chemical stripping and cleaning solutions.
10.0 Estimate costs and provide quotations.
11.0 Advise on the suitability of different materials.

12.0 Demonstrate appropriate communication skills.
13.0 Demonstrate appropriate math skills.
14.0 Demonstrate appropriate understanding of basic science.
15.0 Demonstrate employability skills.
16.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Painting And Decorating
Secondary Number: 8721500
Postsecondary Number: I460408

01.0 DEMONSTRATE THE ABILITY TO WORK SAFELY--The student will be able to:

- 01.01 Explain the hazards of working above ground and appropriate work habits.
- 01.02 Explain and demonstrate safe use of hand and power tools.

02.0 SELECT, USE AND CARE FOR TOOLS AND EQUIPMENT, SCAFFOLDING AND LADDERS--The student will be able to:

- 02.01 Erect a scaffold.
- 02.02 Demonstrate proper use of folding and extension ladders.
- 02.03 Explain proper storage of flammable materials.
- 02.04 Explain and demonstrate proper cleaning and storage of tools and equipment.

03.0 DEMONSTRATE PROFICIENCY IN PREPARATION OF SURFACES--The student will be able to:

- 03.01 Prepare new wood surfaces for coating with paint.
- 03.02 Remove old wall coverings.
- 03.03 Prepare and seal walls for wallcoverings.
- 03.04 Prime plaster and sheetrock surfaces for painting.
- 03.05 Prepare metal surfaces for painting.
- 03.06 Use sandblasting equipment to remove old surface coatings.
- 03.07 Spackle/patch sheetrock and plaster surfaces.

04.0 DEMONSTRATE THE USE OF THE MATERIALS USED IN PAINTING--The student will be able to:

- 04.01 Explain the criteria for selection and use of water and chemical based coatings.
- 04.02 Select brushes, roller covers and spray equipment for coatings to be used.

05.0 DEMONSTRATE PROPER APPLICATION OF MATERIALS USED IN PAINTING USING BRUSHES, ROLLERS, AND SPRAYERS--The student will be able to:

- 05.01 Paint a surface using a brush.
- 05.02 Paint trim with a brush.
- 05.03 Paint a surface with a roller.
- 05.04 Spray paint a surface.

06.0 FIT AND APPLY WALLPAPER--The student will be able to:

- 06.01 Select and mix paste (for non-prepasted) wall coverings.
- 06.02 Apply grass cloth wall covering.

06.03 Apply paper wall covering.
06.04 Apply foil wall covering.
06.05 Apply mylar wall covering.
06.06 Apply cloth-backed wallcovering.
06.07 Match a pattern to a corner.
06.08 Fit wall paper around a window and door.

07.0 MIX COLORS AND MATCH SAMPLES--The student will be able to:

07.01 Identify fundamental colors.
07.02 Explain the process of mixing to arrive at custom colors or tints.
07.03 Mix paint to match a given sample.

08.0 APPLY STAINS, VARNISHES, LACQUERS AND ACRYLICS--The student will be able to:

08.01 Stain woodwork to a uniform color.
08.02 Stain wood to match a sample.
08.03 Seal wood for finishing.
08.04 Apply a varnish finish to a prepared wood surface.
08.05 Apply an oil finish to a prepared wood surface.
08.06 Apply a lacquer finish to a prepared wood surface.
08.07 Apply an acrylic finish to a prepared wood surface.

09.0 USE CHEMICAL STRIPPING AND CLEANING SOLUTIONS--The student will be able to:

09.01 Remove a finish from a painted surface using a chemical solution.
09.02 Use prepared solutions to clean a surface.
09.03 Apply rust inhibitors to metal surfaces.

10.0 ESTIMATE COST AND PROVIDE QUOTATIONS--The student will be able to:

10.01 Compute number of rolls of wallpaper required for a specified job.
10.02 Compute amount of paint for a specified job.

11.0 ADVISE ON SUITABILITY OF DIFFERENT MATERIALS--The student will be able to:

11.01 Select a suitable type of wallcovering based on surface of wall and environment.
11.02 Select a suitable type of coating based on surface, anticipated wear and environment.

12.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

12.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.

12.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
12.03 Read and follow written and oral instructions.
12.04 Answer and ask questions coherently and concisely.
12.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
12.06 Demonstrate appropriate telephone/communication skills.

13.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

13.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
13.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
13.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
13.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
13.05 Demonstrate an understanding of federal, state and local taxes and their computation.

14.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

14.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
14.02 Draw conclusions or make inferences from data.
14.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
14.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

15.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

15.01 Conduct a job search.
15.02 Secure information about a job.
15.03 Identify documents which may be required when applying for a job interview.
15.04 Complete a job application form correctly.
15.05 Demonstrate competence in job interview techniques.
15.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
15.07 Identify acceptable work habits.
15.08 Demonstrate knowledge of how to make job changes appropriately.
15.09 Demonstrate acceptable employee health habits.
15.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

16.01 Define entrepreneurship.

16.02 Describe the importance of entrepreneurship to the American economy.

16.03 List the advantages and disadvantages of business ownership.

16.04 Identify the risks involved in ownership of a business.

16.05 Identify the necessary personal characteristics of a successful entrepreneur.

16.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721510
Course Title: Painting and Decorating 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in safe and proper use and care of related tools and equipment proper safety practices, the use storage and disposal materials.

01.0 DEMONSTRATE THE ABILITY TO WORK SAFELY--The student will be able to:

- 01.01 Explain the hazards of working above ground and appropriate work habits.
- 01.02 Explain and demonstrate safe use of hand and power tools.

02.0 SELECT, USE AND CARE FOR TOOLS AND EQUIPMENT, SCAFFOLDING AND LADDERS--The student will be able to:

- 02.01 Erect a scaffold.
- 02.02 Demonstrate proper use of folding and extension ladders.
- 02.03 Explain proper storage of flammable materials.
- 02.04 Explain and demonstrate proper cleaning and storage of tools and equipment.

03.0 DEMONSTRATE PROFICIENCY IN PREPARATION OF SURFACES--The student will be able to:

- 03.01 Prepare new wood surfaces for coating with paint.
- 03.02 Remove old wall coverings.
- 03.03 Prepare and seal walls for wallcoverings.
- 03.04 Prime plaster and sheetrock surfaces for painting.
- 03.05 Prepare metal surfaces for painting.
- 03.06 Use sandblasting equipment to remove old surface coatings.
- 03.07 Spackle/patch sheetrock and plaster surfaces.

09.0 USE CHEMICAL STRIPPING AND CLEANING SOLUTIONS--The student will be able to:

- 09.01 Remove a finish from a painted surface using a chemical solution.
- 09.02 Use prepared solutions to clean a surface.
- 09.03 Apply rust inhibitors to metal surfaces.

10.0 ESTIMATE COST AND PROVIDE QUOTATIONS--The student will be able to:

- 10.01 Compute number of rolls of wallpaper required for a specified job.
- 10.02 Compute amount of paint for a specified job.

12.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

12.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
12.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
12.03 Read and follow written and oral instructions.
12.04 Answer and ask questions coherently and concisely.
12.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
12.06 Demonstrate appropriate telephone/communication skills.

13.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

13.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
13.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
13.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
13.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
13.05 Demonstrate an understanding of federal, state and local taxes and their computation.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721520
Course Title: Painting and Decorating 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the proper use and care of painting equipment, selection, mixing and application of materials used in painting.

04.0 DEMONSTRATE THE USE OF THE MATERIALS USED IN PAINTING--The student will be able to:

- 04.01 Explain the criteria for selection and use of water and chemical based coatings.
- 04.02 Select brushes, roller covers and spray equipment for coatings to be used.

05.0 DEMONSTRATE PROPER APPLICATION OF MATERIALS USED IN PAINTING USING BRUSHES, ROLLERS, AND SPRAYERS--The student will be able to:

- 05.01 Paint a surface using a brush.
- 05.02 Paint trim with a brush.
- 05.03 Paint a surface with a roller.
- 05.04 Spray paint a surface.

07.0 MIX COLORS AND MATCH SAMPLES--The student will be able to:

- 07.01 Identify fundamental colors.
- 07.02 Explain the process of mixing to arrive at custom colors or tints.
- 07.03 Mix paint to match a given sample.

14.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 14.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 14.02 Draw conclusions or make inferences from data.
- 14.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 14.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721530
Course Title: Painting and Decorating 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the preparation of surfaces for finishes, the selection, mixing and application of stains, varnishes, lacquers and finishes.

08.0 APPLY STAINS, VARNISHES, LACQUERS AND ACRYLICS--The student will be able to:

- 08.01 Stain woodwork to a uniform color.
- 08.02 Stain wood to match a sample.
- 08.03 Seal wood for finishing.
- 08.04 Apply a varnish finish to a prepared wood surface.
- 08.05 Apply an oil finish to a prepared wood surface.
- 08.06 Apply a lacquer finish to a prepared wood surface.
- 08.07 Apply an acrylic finish to a prepared wood surface.

11.0 ADVISE ON SUITABILITY OF DIFFERENT MATERIALS--The student will be able to:

- 11.01 Select a suitable type of wallcovering based on surface of wall and environment.
- 11.02 Select a suitable type of coating based on surface, anticipated wear and environment.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721540
Course Title: Painting and Decorating 4
Course Credit: 1

COURSE DESCRIPTION:

06.0 FIT AND APPLY WALLPAPER--The student will be able to:

- 06.01 Select and mix paste (for non-prepasted) wall coverings.
- 06.02 Apply grass cloth wall covering.
- 06.03 Apply paper wall covering.
- 06.04 Apply foil wall covering.
- 06.05 Apply mylar wall covering.
- 06.06 Apply cloth-backed wallcovering.
- 06.07 Match a pattern to a corner.
- 06.08 Fit wall paper around a window and door.

15.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 15.01 Conduct a job search.
- 15.02 Secure information about a job.
- 15.03 Identify documents which may be required when applying for a job interview.
- 15.04 Complete a job application form correctly.
- 15.05 Demonstrate competence in job interview techniques.
- 15.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
- 15.07 Identify acceptable work habits.
- 15.08 Demonstrate knowledge of how to make job changes appropriately.
- 15.09 Demonstrate acceptable employee health habits.
- 15.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 16.01 Define entrepreneurship.
- 16.02 Describe the importance of entrepreneurship to the American economy.
- 16.03 List the advantages and disadvantages of business ownership.
- 16.04 Identify the risks involved in ownership of a business.
- 16.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 16.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Photographic Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0610.010300
Grade Level	College Credits
Length	AS Degree/64
Certification	

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as a photographer or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, using film, cameras, chemicals, photographic papers, laboratory practices, photographic equipment, and technical recording and reporting.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Photography industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in the tools, test equipment, materials and processes used in the photography program similar to those used in industry. Students should be able to use the various types of precision equipment found in general use throughout the photography industry for the purpose of photographing, processing and presenting photography.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a

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career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Perform laboratory skills.
02.0 Control exposures (35mm camera).
03.0 Take basic photographs (35mm camera).
04.0 Operate various format cameras.
05.0 Finish photographs.
06.0 Apply lighting techniques.
07.0 Take studio photographs.
08.0 Reproduce photographic media.
09.0 Process color film.
10.0 Print color photographs.
11.0 Produce media presentations.
12.0 Demonstrate competencies required to manage a photographic business.
13.0 Take photographs for news media.
14.0 Apply quality control.
15.0 Demonstrate appropriate communication skills.
16.0 Demonstrate appropriate math skills.
17.0 Demonstrate appropriate understanding of basic science.
18.0 Demonstrate employability skills.
19.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Photographic Technology
Secondary Number:
Postsecondary Number: 0610.010300

01.0 PERFORM LABORATORY SKILLS--The student will be able to:

- 01.01 Mix developers and other chemicals.
- 01.02 Hand-process black and white film.
- 01.03 Print black and white photographs.
- 01.04 Process black and white paper.
- 01.05 Process high contrast film.
- 01.06 Perform toning skills.
- 01.07 Produce pan masking.
- 01.08 Produce black and white print using automated processing.

02.0 CONTROL EXPOSURES--The student will be able to:

- 02.01 Set appropriate F-stops and shutter speeds.
- 02.02 Select appropriate film type.

03.0 TAKE BASIC PHOTOGRAPHS (35mm CAMERA)--The student will be able to:

- 03.01 Apply camera care and maintenance principles.
- 03.02 Compose photographs.
- 03.03 Take still photographs.
- 03.04 Take action photographs.

04.0 OPERATE VARIOUS FORMAT CAMERAS--The student will be able to:

- 04.01 Use a 2¼ format camera.
- 04.02 Use a view camera.
- 04.03 Use a front screen projection system.
- 04.04 Use 8 X 10 format.

05.0 FINISH PHOTOGRAPHS--The student will be able to:

- 05.01 Mount photographs.
- 05.02 Mat/frame photographs.
- 05.03 Apply print retouching.
- 05.04 Apply color lacquer spray.
- 05.05 Apply photo enhancement.

06.0 APPLY LIGHTING TECHNIQUES--The student will be able to:

- 06.01 Take photographs with available light.
- 06.02 Take photographs with electronic strobe.
- 06.03 Take photographs with photo-flood lighting.
- 06.04 Take photographs with quartz lighting.
- 06.05 Take photographs with parabolic lighting.

07.0 TAKE STUDIO PHOTOGRAPHS--The student will be able to:

- 07.01 Take commercial photographs.
- 07.02 Take portraits.
- 07.03 Take industrial photographs.

08.0 REPRODUCE PHOTOGRAPHIC MEDIA--The student will be able to:

- 08.01 Copy prints.
- 08.02 Copy transparencies.
- 08.03 Make inter-negatives.
- 08.04 Make a translite.
- 08.05 Make a halftone print.
- 08.06 Identify and define color separation.

09.0 PROCESS COLOR FILM--The student will be able to:

- 09.01 Hand process color negatives and transparencies.
- 09.02 Process color negatives and transparencies with automation.
- 09.03 Mix color film chemistry and maintain replenishment.

10.0 PRINT COLOR PHOTOGRAPHS--The student will be able to:

- 10.01 Process color paper.
- 10.02 Print color negatives.
- 10.03 Print color negatives using color analyzer.
- 10.04 Mix color paper chemistry and maintain replenishment.
- 10.05 Print color transparencies.

11.0 PRODUCE MEDIA PRESENTATIONS--The student will be able to:

- 11.01 Prepare script for slide presentation.
- 11.02 Shoot slides for slide presentation.
- 11.03 Produce slide presentation.
- 11.04 Prepare script for video presentation.
- 11.05 Shoot video tapes.
- 11.06 Produce video presentation.
- 11.07 Prepare storyboard for slide presentation.
- 11.08 Record sound for slide presentation.
- 11.09 Record sound for video presentation.

12.0 DEMONSTRATE COMPETENCIES REQUIRED TO MANAGE A PHOTOGRAPHIC BUSINESS--The student will be able to:

- 12.01 Apply communication skills.
- 12.02 Apply human relations skills.
- 12.03 Set rates for photographic work.
- 12.04 Maintain shop records and files.
- 12.05 Develop effective advertising.
- 12.06 Maintain presentational portfolio.
- 12.07 Analyze potential market area.
- 12.08 Analyze and develop a marketing plan.
- 12.09 Perform cost analysis.

12.10 Prepare basic media release
12.11 Apply accounting techniques.

13.0 TAKE PHOTOGRAPHS FOR NEWS MEDIA--The student will be able to:

13.01 Identify photographers legal rights/responsibilities.
13.02 Identify rules/regulations of copyright.
13.03 Take photographs for news media.
13.04 Write captions for photos.
13.05 Identify special camera accessories.
13.06 Identify specialized optics for photojournalism.

14.0 APPLY QUALITY CONTROL--The student will be able to:

14.01 Run control strips.
14.02 Plot control results.
14.03 Graft processors performance.
14.04 Maintain pH control of chemistry.
14.05 Operate densitometer.

15.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

15.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
15.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
15.03 Read and follow written and oral instructions.
15.04 Answer and ask questions coherently and concisely.
15.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
15.06 Demonstrate appropriate telephone/communication skills.

16.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

16.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
16.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
16.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
16.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
16.05 Demonstrate an understanding of federal, state and local taxes and their computation.

17.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

17.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

17.02 Draw conclusions or make inferences from data.
17.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
17.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct a job search.
18.02 Secure information about a job.
18.03 Identify documents which may be required when applying for a job interview.
18.04 Complete a job application form correctly.
18.05 Demonstrate competence in job interview techniques.
18.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
18.07 Identify acceptable work habits.
18.08 Demonstrate knowledge of how to make job changes appropriately.
18.09 Demonstrate acceptable employee health habits.
18.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

19.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

19.01 Define entrepreneurship.
19.02 Describe the importance of entrepreneurship to the American economy.
19.03 List the advantages and disadvantages of business ownership.
19.04 Identify the risks involved in ownership of a business.
19.05 Identify the necessary personal characteristics of a successful entrepreneur.
19.06 Identify the business skills needed to operate a small business efficiently and effectively.

06460503CL July 1997

Florida Department of Education
CLUSTER CURRICULUM FRAMEWORK

Cluster Title:	Pipe Trade Systems Technology
Cluster Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	One Core, Two Programs, Six Occupational Completion Points

	Secondary	PSAV
Grade Level	9-12, 30, 31	30, 31
Facility Code	203	203
VSO	VICA	VICA
Coop Method	Yes	Yes
Apprenticeship	Yes	Yes

I. **PURPOSE:** The purpose of the programs in this cluster is to prepare students for employment or advanced training in the heating, air-conditioning (A/C), and refrigeration industry. The programs in this cluster prepare students for employment as Heating, A/C, and Refrigeration Helper (Industry Title), Heating, A/C, and Refrigeration Service Mechanic (Industry Title), Heating, A/C, and Refrigeration Technician (Industry Title), Heating, Air Conditioning, and Refrigeration Mechanic (OES 85902654), and Refrigeration Mechanic)OES 22511236).

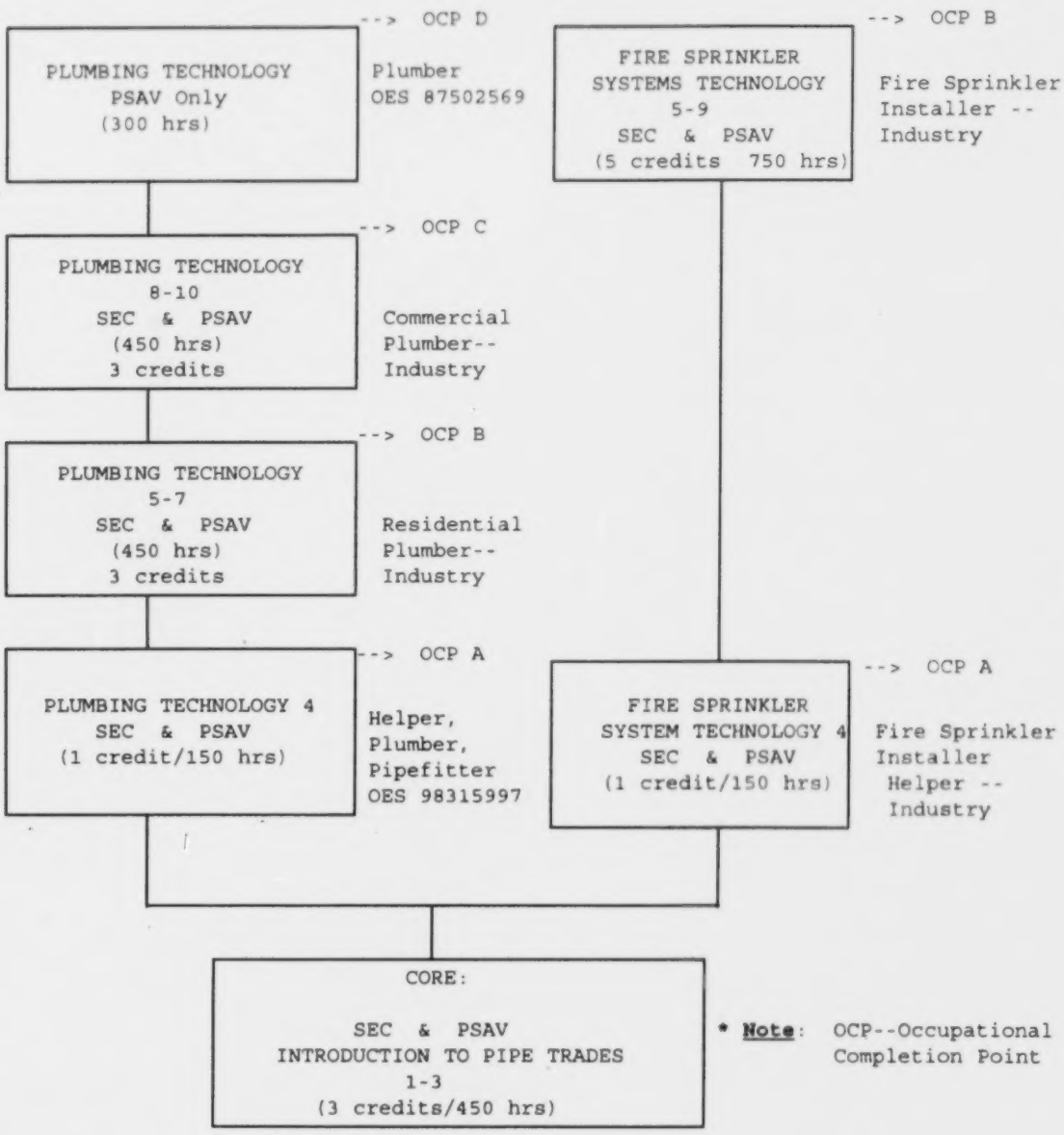
The programs in this cluster also provide supplemental training for persons previously or currently employed in the heating, air-conditioning, and refrigeration industry. The student should obtain EPA certification prior to leaving school in order to be employed in any job that requires work with refrigerants.

This cluster of programs focuses on broad, transferable skills, stresses understanding of all aspects of the pipe industry, and demonstrates elements of the Pipe Trades industry; such as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **CLUSTER STRUCTURE:** This cluster is a planned sequence of instruction consisting of a core and two programs with one common core and six occupational completion points. The recommended sequence allows students to complete specified portions of the program for employment or to remain for advanced training. A student who completes the applicable competencies at any occupational completion point may either continue with the training program or terminate as an occupational completer. It is recommended that students complete the core or demonstrate a mastery of the student performance standards contained in the core before advancing to the course(s) in the next level of either of the programs, Plumbing Technology and Fire Sprinkler Systems Technology.

The following diagram illustrates the cluster structure:

PIPE TRADES SYSTEMS TECHNOLOGY CLUSTER



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At the secondary level, this cluster of programs consists of the following courses, which include the core:

PLUMBING TECHNOLOGY PROGRAM - 10 Secondary Credits + 300 PSAV Hours

CORE COURSES
8720001 - Introduction to Pipe Trades 1
8720002 - Introduction to Pipe Trades 2
8720003 - Introduction to Pipe Trades 3

COURSES
8721610 - Plumbing Technology 4
8721620 - Plumbing Technology 5
8721630 - Plumbing Technology 6
8721640 - Plumbing Technology 7
8721650 - Plumbing Technology 8
8721660 - Plumbing Technology 9
8721670 - Plumbing Technology 10

FIRE SPRINKLER SYSTEMS TECHNOLOGY PROGRAM - 9 Secondary Credits + 300 PSAV Hours

CORE COURSES
8720001 - Introduction to Pipe Trades 1
8720002 - Introduction to Pipe Trades 2
8720003 - Introduction to Pipe Trades 3

COURSES
8721810 - Fire Sprinkler Systems Technology 4
8721810 - Fire Sprinkler Systems Technology 5
8721830 - Fire Sprinkler Systems Technology 6
8721840 - Fire Sprinkler Systems Technology 7
8721850 - Fire Sprinkler Systems Technology 8
8721860 - Fire Sprinkler Systems Technology 9

Note: Students enrolled in an apprenticeship program for the Fire Sprinkler Systems Technology Program should become journeys when they complete the apprenticeship program if they meet the program requirements and pass all examinations administered during the apprenticeship period.

III. **LABORATORY ACTIVITIES:** Classroom shop, and laboratory activities are an integral part of this cluster. These activities include instruction in the use of safety procedures, tools, equipment, materials, and processes found in the industry. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation. A generic equipment list for the programs in this cluster is available.

IV. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., (VICA) is the appropriate vocational student organization (VSO) for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such

organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The programs in this cluster may be offered in Postsecondary Adult Vocational (PSAV) courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The cooperative method of instruction, on-the-job training (OJT), is appropriate for these programs. Whenever the cooperative method is offered, the following are required for each student: (1) a training plan that is signed by the student, teacher, and employer and that includes instructional objectives and a list of on-the-job and in-school learning experiences and (2) a workstation that reflects the equipment, skills, and tasks relevant to the occupation that the student has chosen as a career goal. The student must be paid for work performed.

In accordance with Rule 6A-10.040, FAC., the minimum basic skills grade levels required for postsecondary adult vocational students to exit the programs in this cluster are listed before the intended outcomes for each program. These grade-level numbers correspond to a grade-equivalent scores obtained on one of the state designated basic-skills examinations. If a student does not meet the basic skills level required for completion of a program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) or remedial lab. Please reference to the Rule for exemptions.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

When a secondary student with a disability is enrolled in a vocational class for which modifications to the curriculum framework has been made, the particular outcomes and student performance standards that the student must master to earn credit must be specified in the student's Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this program must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

Florida Department of Education
INTENDED OUTCOMES

Program Title: Plumbing Technology Program

	Secondary	PSAV
Program Numbers	**8721600**	**I460513**
CIP Number	0646.050302	0646.050302
Grade Level	9-12, 30, 31	30, 31
Length	10 Credits	1800 Hours
Certification	PLUMBIN @7 G	PLUMBIN @7 G
	TECH CONSTR !7!G	TECH CONSTR !7!G
	BLDG CONST !7!G	BLDG CONST !7!G
Basic Skills		
Math		9
Language		9
Reading		9

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
HELPER, PLUMBER, PIPEFITTER - OES Code 98315997

01.0 Describe career and training opportunities in the pipe-trade industry.
02.0 Demonstrate a basic pipe-trade knowledge.
03.0 Identify the use and care of basic tools in the pipe-trade industry.
04.0 Identify safe working conditions and observe safety precautions.
05.0 Apply pipe-trade-related basic math.
06.0 Demonstrate an understanding of basic science.
07.0 Read and interpret blueprints and specifications.
08.0 Read and interpret basic pipe-trade codes.
09.0 Demonstrate employability skills.
10.0 Demonstrate communication skills.
11.0 Demonstrate an understanding of entrepreneurship.
12.0 Demonstrate positive human relations skills.
13.0 Perform basic plumbing skills.
14.0 Cut and join pipes.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
RESIDENTIAL PLUMBER - Industry Title

15.0 Demonstrate a knowledge of plumbing codes.
16.0 Read and interpret blueprints and specifications.
17.0 Lay out and coordinate a job.
18.0 Install first rough (underground).
19.0 Install second rough (first floor and above).
20.0 Trim out plumbing.
21.0 Demonstrate positive customer-relations skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
COMMERCIAL PLUMBER - Industry Title

22.0 Demonstrate a knowledge of installing hot-water-heating and circulating-systems.
23.0 Demonstrate a knowledge of installing interceptors and separators.
24.0 Demonstrate a knowledge of installing a storm drainage system.
25.0 Demonstrate an understanding of the principles of backflow cross and connection control.

OCCUPATIONAL COMPLETION POINT - DATA CODE D

PLUMBER - OES 87502569

26.0 Demonstrate a knowledge of the process of installing a medical gas system. (optional)
27.0 Install a liquid propane gas (LPG) system.
28.0 Repair, service, and maintain plumbing systems.
29.0 Demonstrate an understanding of how to connect residential plumbing to a municipal sewer line. (optional)

Program Title: Plumbing Technology
Secondary Number: 8721600
Postsecondary Number: I460513

OCCUPATIONAL COMPLETION POINT - DATA CODE A

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

PLUMBER HELPER - OES 98315997

01.0 DESCRIBE CAREER AND TRAINING OPPORTUNITIES IN THE PIPE-TRADE INDUSTRY--The student will be able to:

- 01.01 Obtain information on current and future job opportunities in the pipe-trade industry, and discuss its trends.
- 01.02 Describe career ladders (entry-, intermediate-, and technical-level careers) in each of the pipe-trade-industry programs and preparation requirements.
- 01.03 Describe advanced-training opportunities, including apprenticeship programs in each of the pipe-trade-industry programs.

02.0 DEMONSTRATE A BASIC KNOWLEDGE OF THE PIPE-TRADE INDUSTRY--The student will be able to:

- 02.01 Discuss the history of pipe trades.
- 02.02 Identify pipes, fittings, materials, and equipment related to pipe trades.
- 02.03 Identify fixtures and appliances for plumbing, fire-sprinkler fitting, pipe fitting, and gas fitting jobs.
- 02.04 Define the terms used in the pipe-trade industry.

03.0 IDENTIFY THE USE AND CARE OF BASIC TOOLS IN THE PIPE-TRADE INDUSTRY--The student will be able to:

- 03.01 Identify and use the basic tools, equipment, and materials of the pipe-trade industry.
- 03.02 Demonstrate the procedures/techniques for the selection, use, care and storage of tools and equipment.
- 03.03 Compare the various tools used for plumbing, fire-sprinkler fitting, and pipe fitting.
- 03.04 Identify tools and equipment and the safety hazards associated with them.

04.0 IDENTIFY SAFE WORKING CONDITIONS AND OBSERVE SAFETY PRECAUTIONS--The student will be able to:

- 04.01 Explain the importance of following safety precautions when working in the pipe-trade industry.
- 04.02 Observe safety precautions.
- 04.03 Identify safe working practices and safe working conditions in the pipe-trade industry.

04.04 Demonstrate cardiopulmonary resuscitation (CPR) techniques.
04.05 Demonstrate an understanding of when and how to use first aid.

05.0 APPLY PIPE-TRADE-RELATED BASIC MATH--The student will be able to:

05.01 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
05.02 Measure tolerances on horizontal and vertical surfaces, using millimeters, centimeters, feet, and inches.
05.03 Solve pipe-trade-related basic math problems, such as piping offset and metric conversion.
05.04 Calculate material length and bend pipe by hand or with a pipe-bending machine and tools.

06.0 DEMONSTRATE AN UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

06.01 Describe molecular action as a result of temperature and pressure extremes, chemical reaction, and moisture content.
06.02 Draw conclusions or make inferences from data, such as temperature or pressure conversion.
06.03 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and describe the proper precautions for handling such materials.
06.04 Discuss environmental concerns related to hazardous waste and chemical disposal.
06.05 Explain pressure measurement in terms of pounds per square inch (PSI) and inches of mercury.
06.06 Explain how to use alternating-current meters and instruments in the pipe trades.

07.0 READ AND INTERPRET BLUEPRINTS AND JOB SPECIFICATIONS--The student will be able to:

07.01 Read and interpret measuring devices.
07.02 Draw and interpret basic isometric sketches.
07.03 Identify the basic symbols used in the pipe trades.
07.04 Read and interpret manufacturers' schematics and specifications.

08.0 READ AND INTERPRET BASIC PIPE-TRADE CODES--The student will be able to:

08.01 Describe the importance of following the local, state, and national codes for plumbing, fire-sprinkler fitting, gas fitting, and/or pipe fitting.
08.02 Read and interpret current standards and codes for plumbing, fire-sprinkler fitting, gas fitting, and/or pipe fitting.
08.03 Read and interpret basic building codes in the pipe-trade industry.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

09.01 Demonstrate productive work habits and positive attitudes.

09.02 Identify the ethical and responsible practices expected of pipe-trade industry employees.
09.03 Demonstrate acceptable personal-hygiene habits and a professional appearance.
09.04 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
09.05 Explain the importance of taking pride in the quality of work performed.
09.06 Describe the importance of a drug-free workplace and the industry's policies toward drug use.
09.07 Describe the importance of maintaining a good driver's record and the ramifications of a poor driving record on employment opportunities.
09.08 Describe "Florida's Right-to-Know" Law as recorded in the Florida Statutes, Chapter 442.
09.09 Conduct a job search and identify advanced-training opportunities, including an apprenticeship program.
09.10 Secure information about a job.
09.11 Identify documents that may be required for an application for a job or an apprenticeship program.
09.12 Complete a job-application form.
09.13 Demonstrate competence in job-interview techniques.
09.14 Demonstrate a knowledge of how to make job changes appropriately.

10.0 DEMONSTRATE COMMUNICATION SKILLS--The student will be able to:

10.01 Ask and answer questions coherently and concisely.
10.02 Read and follow written instructions and listen to and follow oral instructions.
10.03 Give reports orally and in writing.
10.04 Read and interpret reading materials related to the pipe-trade industry.
10.05 Find information in technical literature such as a manufacturer's manual.
10.06 Read and interpret graphs, charts, diagrams, and tables commonly used in the pipe-trade industry/occupation area.
10.07 Write logical and understandable statements or phrases, and accurately fill out the forms/invoices commonly used in the pipe-trade industry.
10.08 Communicate job-related information and coordinate with other trades.
10.09 Demonstrate appropriate telephone communication skills.
10.10 Demonstrate trade-related computer skills.

11.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

11.01 Define "entrepreneurship."
11.02 Describe the importance of entrepreneurship to the American economy and the role of small business in the free-enterprise system.
11.03 Discuss the advantages and disadvantages of business ownership.
11.04 Discuss the risks involved in the ownership of a business.

11.05 Identify the personal characteristics of a successful entrepreneur.

11.06 Identify the business skills, including computer skills, needed to operate a business efficiently and effectively.

12.0 DEMONSTRATE POSITIVE HUMAN-RELATIONS SKILLS--The student will be able to:

12.01 Exercise self-control.

12.02 Identify and demonstrate appropriate responses to criticism.

12.03 Recognize basic human-relations skills as they relate to success in the pipe-trade industry.

12.04 Resolve conflicts in a positive, professional manner.

13.0 PERFORM BASIC PLUMBING SKILLS--The student will be able to:

13.01 Explain the basic theory and principles of plumbing.

13.02 Identify:

a. pipe and fittings
b. pipe-joining methods
c. plumbing fixtures, appliances, materials, and equipment
d. valves by type, size, materials, and application

14.0 CUT AND JOIN PIPES--The student will be able to:

14.01 Join different types of pipes (including PVC, galvanized, steel, plastic, copper, and cast-iron pipes) according to plumbing codes and specifications, using various methods, including:

a. brazing
b. clamping
c. compression
d. threading
e. flange
f. flaring
g. gasket joint
h. gluing
i. lead-oakum joint
j. soldering
k. welding

14.02 Measure, mark, and cut different types of pipes, using various pipe cutters, such as:

a. one-wheel steel-pipe cutter
b. four-wheel steel-pipe cutter
c. hack saw
d. tubing cutter
e. cutting torch

14.03 Thread a steel pipe with a power-driven vise stand or a pipe-threading machine.

14.04 Demonstrate proficiency in using the tools, following safety practices and procedures.

OCCUPATIONAL COMPLETION POINT - DATA CODE B

RESIDENTIAL PLUMBER - Industry Title

15.0 DEMONSTRATE A KNOWLEDGE OF PLUMBING CODES--The student will be able to:

15.01 Describe and explain the purpose of plumbing codes.
15.02 Apply the basic theory and principles of plumbing in relation to the codes.
15.03 Read and locate information in the applicable plumbing codes.
15.04 Define and explain the terms used in the plumbing codes.
15.05 Explain why the code may supersede the manufacturer's specifications.

16.0 READ AND INTERPRET BLUEPRINTS AND SPECIFICATIONS--The student will be able to:

16.01 Recognize and identify plumbing symbols.
16.02 Identify basic plumbing systems from the blueprint.
16.03 From the blueprints and specifications, identify the plumbing fixtures and materials required for the plumbing job.
16.04 Relate the blueprint to all applicable (local, state, and federal) plumbing codes.
16.05 Cross-reference all working drawings to determine the location and elevation of the piping system and duct work.
16.06 Demonstrate trade-related computer skills for blueprints and specifications.

17.0 LAY OUT AND COORDINATE A JOB--The student will be able to:

17.01 Identify specifications.
17.02 Make a list of materials required to lay out a job.
17.03 Determine the work aids required and the sequence of installations, according to building plans, specifications, and working drawings.
17.04 Inspect structures to prevent a weakening of the structure resulting from the installation of pipes.
17.05 Coordinate with other crafts.
17.06 Install high- and low-pressure pipe systems.

18.0 INSTALL THE FIRST ROUGH (UNDERGROUND)--The student will be able to:

18.01 Lay out a job on site underground and establish a starting point according to codes and specifications, coordinating with other crafts.
18.02 Install building drain, waste, vent, storm drainage, and water-heating-and-circulating systems.
18.03 Install distribution systems.
18.04 Install a temporary water service with backflow prevention.
18.05 Test and inspect the first rough.

19.0 INSTALL THE SECOND ROUGH (FIRST FLOOR AND ABOVE) -The student will be able to:

19.01 Lay out a job on site for the first floor and above according to codes and specifications, coordinating with other crafts.
19.02 Cut openings in walls and floors to accommodate the pipe and fittings.

19.03 Install hangers and supports.
19.04 Install building-drain, waste, vent, storm-drainage, and water-heating-and-circulating systems, including both tubs and spas.
19.05 Install distribution systems.
19.06 Test and inspect the second rough.

20.0 TRIM OUT PLUMBING--The student will be able to:

20.01 Distribute and place fixtures, appliances, and equipment, including safety devices and control.
20.02 Trim out and install job-site fixtures, appliances, and equipment, which include:
a. closet flanges
b. supply stops on water pipes
c. lavatory
d. water closets
e. showers
f. kitchen sinks
g. garbage disposal
h. ice makers
i. dishwashers
j. water heaters
20.03 Install backflow assemblies as required.
20.04 Test and inspect the final installation.

21.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

21.01 Organize and plan multiple tasks, utilizing various resources such as time, personnel, and materials.
21.02 Analyze problems, identify the causes, and devise plans of action.
21.03 Identify obstacles, generate alternatives, and choose the best alternatives.
21.04 Create new and better ways to perform tasks, applying the latest ideas to putting work in place.
21.05 Explain the nature of the problem(s) and the remedial action(s) needed and advise the customer on preventive maintenance in a professional manner.
21.06 Resolve customer complaints in a positive, professional manner.
21.07 Prepare a job ticket.

OCCUPATIONAL COMPLETION POINT - DATA CODE C
COMMERCIAL PLUMBER - Industry Title

22.0 DEMONSTRATE A KNOWLEDGE OF THE PROCESS OF INSTALLING HOT-WATER-HEATING-AND-CIRCULATING SYSTEMS--The student will be able to:

22.01 Explain the basic theory of domestic hot-water-heating-and-circulating systems.
22.02 Design, size, and lay out a system.
22.03 Identify the equipment and materials needed for the job in accordance with job specifications and plumbing codes.
22.04 Install a distribution system.

22.05 Install equipment controls and safety devices.
22.06 Test and inspect the system.

23.0 DEMONSTRATE A KNOWLEDGE OF THE PROCESS OF INSTALLING INTERCEPTORS AND SEPARATORS--The student will be able to:

23.01 Identify various types of interceptors and separators.
23.02 Explain the theory and function of various interceptors and separators.
23.03 Describe and/or demonstrate procedures for installing and maintaining:
a. lint traps and grease traps
b. gas and oil separators
c. sand and sediment interceptors

24.0 DEMONSTRATE A KNOWLEDGE OF THE PROCESS OF INSTALLING A STORM-DRAINAGE SYSTEM--The student will be able to:

24.01 Explain the theory of roof drains, leaders, and the storm-drainage system.
24.02 Size and lay out a storm-drainage system.
24.03 Identify the materials needed to install a storm-drainage system in accordance with job specifications and plumbing codes.
24.04 Lay out a job on site according to job specifications and plumbing codes, coordinating with other trades.
24.05 Install distribution systems.
24.06 Install roof drains, leaders, and drainage systems.
24.07 Test, balance, and inspect the systems.

25.0 DEMONSTRATE AN UNDERSTANDING OF THE PRINCIPLES OF BACKFLOW AND CROSS-CONNECTION CONTROL--The student will be able to:

25.01 Define backflow and cross-connection control.
25.02 Describe the importance of backflow and cross-connection control to the health of the public.
25.03 Identify the proper devices and assemblies for individual applications.
25.04 Explain the "degree of hazard" principle and how it relates to the installation of devices and assemblies.

OCCUPATIONAL COMPLETION POINT - DATA CODE D
PLUMBER - OES 87502569

26.0 DEMONSTRATE A KNOWLEDGE OF THE PROCESS OF INSTALLING A MEDICAL GAS SYSTEM (OPTIONAL)--The student will be able to:

26.01 Describe and/or demonstrate procedures for:
a. installing a medical gas system in a health-care facility according to applicable plumbing codes
b. connecting medical equipment, safety devices, and controls
c. testing and inspecting medical gas systems to make sure there is no cross connection and the system is pure

27.0 INSTALL A LIQUID PROPANE GAS (LPG) SYSTEM--The student will be able to:

27.01 Identify materials required for LPG installation.
27.02 Design, size, and lay out a job on site according to plumbing codes and specifications codes, coordinating with other trades.
27.03 Install an LPG system.
27.04 Install distribution systems, including equipment, safety devices, and controls.
27.05 Test and inspect the systems.

28.0 REPAIR, SERVICE, AND MAINTAIN PLUMBING SYSTEMS--The student will be able to:

28.01 Troubleshoot and diagnose plumbing systems.
28.02 Repair and replace water service and sanitary lines.
28.03 Repair and replace water closets, ball cocks, flush valves, floats, lift rods, ball stoppers, and trip levers.
28.04 Repair leaks in traps and faucets.
28.05 Repair and replace sink strainers.
28.06 Repair and replace water heaters.
28.07 Replace and repair fixture water-supply pipes.
28.08 Reseal water closets to flanges.
28.09 Test and inspect repaired systems.
28.10 Clear obstructions from kitchen sink, water closet, bathtub, lavatory, and sewer lines, using chemicals and tools.

29.0 DEMONSTRATE AN UNDERSTANDING OF HOW TO CONNECT RESIDENTIAL PLUMBING TO A MUNICIPAL SEWER LINE (OPTIONAL)--The student will be able to:

29.01 Describe who is allowed, according to municipal codes, to tap into a sewer line.
29.02 Dig a ditch from the house drain to a sewer main.
29.03 Connect the house drain to the sewer main.
29.04 Test, balance, and inspect the system.

Program: 8721600 Plumbing Technology

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8720001
Course Title: Introduction to Pipe Trades 1
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to pipe trades. These competencies relate to career and training opportunities, the use and care of tools, safety precautions, basic-math applications, standards and codes, and human relations.

01.0 DESCRIBE CAREER AND TRAINING OPPORTUNITIES IN THE PIPE-TRADE INDUSTRY--The student will be able to:

- 01.01 Obtain information on current and future job opportunities in the pipe-trade industry. and discuss its trends.
- 01.02 Describe career ladders (entry-, intermediate-, and technical-level careers) in each of the pipe-trade-industry programs and preparation requirements.
- 01.03 Describe advanced-training opportunities, including apprenticeship programs in each of the pipe-trade-industry programs.

02.0 DEMONSTRATE A BASIC KNOWLEDGE OF THE PIPE-TRADE INDUSTRY--The student will be able to:

- 02.01 Discuss the history of pipe trades.
- 02.02 Identify pipes, fittings, materials, and equipment related to pipe trades.
- 02.03 Identify fixtures and appliances for plumbing, fire-sprinkler fitting, pipe fitting, and gas fitting jobs.
- 02.04 Define the terms used in the pipe-trade industry.

03.0 IDENTIFY THE USE AND CARE OF BASIC TOOLS IN THE PIPE-TRADE INDUSTRY--The student will be able to:

- 03.01 Identify and use the basic tools, equipment, and materials of the pipe-trade industry.
- 03.02 Demonstrate the procedures/techniques for the selection, use, care and storage of tools and equipment.
- 03.03 Compare the various tools used for plumbing, fire-sprinkler fitting, and pipe fitting.
- 03.04 Identify tools and equipment and the safety hazards associated with them.

04.0 IDENTIFY SAFE WORKING CONDITIONS AND OBSERVE SAFETY PRECAUTIONS--The student will be able to:

04.01 Explain the importance of following safety precautions when working in the pipe-trade industry.
04.02 Observe safety precautions.
04.03 Identify safe working practices and safe working conditions in the pipe-trade industry.

05.0 APPLY PIPE-TRADE-RELATED BASIC MATH--The student will be able to:

05.01 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
05.02 Measure tolerances on horizontal and vertical surfaces, using millimeters, centimeters, feet, and inches.

08.0 READ AND INTERPRET BASIC PIPE-TRADE CODES--The student will be able to:

08.01 Describe the importance of following the local, state, and national codes for plumbing, fire-sprinkler fitting, gas fitting, and/or pipe fitting.

12.0 DEMONSTRATE POSITIVE HUMAN-RELATIONS SKILLS--The student will be able to:

12.01 Exercise self-control.
12.02 Identify and demonstrate appropriate responses to criticism.
12.03 Recognize basic human-relations skills as they relate to success in the pipe-trade industry.
12.04 Resolve conflicts in a positive, professional manner.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8720002
Course Title: Introduction to Pipe Trades 2
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to pipe trades. These competencies relate to safety, pipe-trade-related math applications, basic science, standards and codes, employability skills, and communication.

04.0 IDENTIFY SAFE WORKING CONDITIONS AND OBSERVE SAFETY PRECAUTIONS--The student will be able to:

- 04.04 Demonstrate cardiopulmonary resuscitation (CPR) techniques.
- 04.05 Demonstrate an understanding of when and how to use first aid.

05.0 APPLY PIPE-TRADE-RELATED BASIC MATH--The student will be able to:

- 05.03 Solve pipe-trade-related basic math problems, such as piping offset and metric conversion.
- 05.04 Calculate material length and bend pipe by hand or with a pipe-bending machine and tools.

06.0 DEMONSTRATE AN UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 06.01 Describe molecular action as a result of temperature and pressure extremes, chemical reaction, and moisture content.
- 06.02 Draw conclusions or make inferences from data, such as temperature or pressure conversion.
- 06.03 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and describe the proper precautions for handling such materials.
- 06.04 Discuss environmental concerns related to hazardous waste and chemical disposal.
- 06.05 Explain pressure measurement in terms of pounds per square inch (PSI) and inches of mercury.
- 06.06 Explain how to use alternating-current meters and instruments in the pipe trades.

08.0 READ AND INTERPRET BASIC PIPE-TRADE CODES--The student will be able to:

- 08.02 Read and interpret current standards and codes for plumbing, fire-sprinkler fitting, gas fitting, and/or pipe fitting.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 09.01 Demonstrate productive work habits and positive attitudes.

09.02 Identify the ethical and responsible practices expected of pipe-trade-industry employees.
09.03 Demonstrate acceptable personal-hygiene habits and a professional appearance.
09.04 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
09.05 Explain the importance of taking pride in the quality of work performed.
09.06 Describe the importance of a drug-free workplace and the industry's policies toward drug use.
09.07 Describe the importance of maintaining a good driver's record and the ramifications of a poor driving record on employment opportunities.
09.08 Describe "Florida's Right-to-Know" Law as recorded in the Florida Statutes, Chapter 442.

10.0 DEMONSTRATE COMMUNICATION SKILLS--The student will be able to:

10.01 Ask and answer questions coherently and concisely.
10.02 Read and follow written instructions and listen to and follow oral instructions.
10.03 Give reports orally and in writing.
10.04 Read and interpret reading materials related to the pipe-trade industry.
10.05 Find information in technical literature such as a manufacturer's manual.
10.06 Read and interpret graphs, charts, diagrams, and tables commonly used in the pipe-trade industry/occupation area.
10.07 Write logical and understandable statements or phrases, and accurately fill out the forms/invoices commonly used in the pipe-trade industry.
10.08 Communicate job-related information and coordinate with other trades.
10.09 Demonstrate appropriate telephone communication skills.
10.10 Demonstrate trade-related computer skills.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8720003
Course Title: Introduction to Pipe Trades 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with competencies relating to blueprint and job specifications, building codes in the pipe trades, employability skills, and entrepreneurship.

07.0 READ AND INTERPRET BLUEPRINTS AND JOB SPECIFICATIONS--The student will be able to:

- 07.01 Read and interpret measuring devices.
- 07.02 Draw and interpret basic isometric sketches.
- 07.03 Identify the basic symbols used in the pipe trades.
- 07.04 Read and interpret manufacturers' schematics and specifications.

08.0 READ AND INTERPRET BASIC PIPE-TRADE CODES--The student will be able to:

- 08.03 Read and interpret basic building codes in the pipe-trade industry.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 09.09 Conduct a job search and identify advanced-training opportunities, including an apprenticeship program.
- 09.10 Secure information about a job.
- 09.11 Identify documents that may be required for an application for a job or an apprenticeship program.
- 09.12 Complete a job-application form.
- 09.13 Demonstrate competence in job-interview techniques.
- 09.14 Demonstrate a knowledge of how to make job changes appropriately.

11.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 11.01 Define "entrepreneurship."
- 11.02 Describe the importance of entrepreneurship to the American economy and the role of small business in the free-enterprise system.
- 11.03 Discuss the advantages and disadvantages of business ownership.
- 11.04 Discuss the risks involved in the ownership of a business.
- 11.05 Identify the personal characteristics of a successful entrepreneur.
- 11.06 Identify the business skills, including computer skills, needed to operate a business efficiently and effectively.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721610
Course Title: Plumbing Technology 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with basic plumbing and pipe-cutting-and-joining skills.

13.0 PERFORM BASIC PLUMBING SKILLS--The student will be able to:

13.01 Explain the basic theory and principles of plumbing.
13.02 Identify:
a. pipe and fittings
b. pipe-joining methods
c. plumbing fixtures, appliances, materials, and equipment
d. valves by type, size, materials, and application

14.0 CUT AND JOIN PIPES--The student will be able to:

14.01 Join different types of pipes (including PVC, galvanized, steel, plastic, copper, and cast-iron pipes) according to plumbing codes and specifications, using various methods, including:
a. brazing
b. clamping
c. compression
d. threading
e. flange
f. flaring
g. gasket joint
h. gluing
i. lead-oakum joint
j. soldering
k. welding

14.02 Measure, mark, and cut different types of pipes, using various pipe cutters, such as:
a. one-wheel steel-pipe cutter
b. four-wheel steel-pipe cutter
c. hack saw
d. tubing cutter
e. cutting torch

14.03 Thread a steel pipe with a power-driven vise stand or a pipe-threading machine.

14.04 Demonstrate proficiency in using the tools, following safety practices and procedures.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721620
Course Title: Plumbing Technology 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with competencies relating to plumbing codes, blueprints and specifications, and job layout and coordination.

15.0 DEMONSTRATE A KNOWLEDGE OF PLUMBING CODES--The student will be able to:

- 15.01 Describe and explain the purpose of plumbing codes.
- 15.02 Apply the basic theory and principles of plumbing in relation to the codes.
- 15.03 Read and locate information in the applicable plumbing codes.
- 15.04 Define and explain the terms used in the plumbing codes.
- 15.05 Explain why the code may supersede the manufacturer's specifications.

16.0 READ AND INTERPRET BLUEPRINTS AND SPECIFICATIONS--The student will be able to:

- 16.01 Recognize and identify plumbing symbols.
- 16.02 Identify basic plumbing systems from the blueprint.
- 16.03 From the blueprints and specifications, identify the plumbing fixtures and materials required for the plumbing job.
- 16.04 Relate the blueprint to all applicable (local, state, and federal) plumbing codes.
- 16.05 Cross-reference all working drawings to determine the location and elevation of the piping system and duct work.
- 16.06 Demonstrate trade-related computer skills for blueprints and specifications.

17.0 LAY OUT AND COORDINATE A JOB--The student will be able to:

- 17.01 Identify specifications.
- 17.02 Make a list of materials required to lay out a job.
- 17.03 Determine the work aids required and the sequence of installations, according to building plans, specifications, and working drawings.
- 17.04 Inspect structures to prevent a weakening of the structure resulting from the installation of pipes.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721630
Course Title: Plumbing Technology 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with competencies in job layout and coordination,and first and second rough installation.

17.0 LAY OUT AND COORDINATE A JOB--The student will be able to:

- 17.05 Coordinate with other crafts.
- 17.06 Install high- and low-pressure pipe systems.

18.0 INSTALL THE FIRST ROUGH (UNDERGROUND)--The student will be able to:

- 18.01 Lay out a job on site underground and establish a starting point according to codes and specifications, coordinating with other crafts.
- 18.02 Install building drain, waste, vent, storm drainage, and water-heating-and-circulating systems.
- 18.03 Install distribution systems.
- 18.04 Install a temporary water service with backflow prevention.
- 18.05 Test and inspect the first rough.

19.0 INSTALL THE SECOND ROUGH (FIRST FLOOR AND ABOVE)--The student will be able to:

- 19.01 Lay out a job on site for the first floor and above according to codes and specifications, coordinating with other crafts.
- 19.02 Cut openings in walls and floors to accommodate the pipe and fittings.
- 19.03 Install hangers and supports.
- 19.04 Install building-drain, waste, vent, storm-drainage, and water-heating-and-circulating systems, including both tubs and spas.
- 19.05 Install distribution systems.
- 19.06 Test and inspect the second rough.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721640
Course Title: Plumbing Technology 7
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with more in-depth study of trimming out plumbing and developing positive customer-relations skills.

20.0 TRIM OUT PLUMBING--The student will be able to:

- 20.01 Distribute and place fixtures, appliances, and equipment, including safety devices and control.
- 20.02 Trim out and install job-site fixtures, appliances, and equipment, which include:
  - a. closet flanges
  - b. supply stops on water pipes
  - c. lavatory
  - d. water closets
  - e. showers
  - f. kitchen sinks
  - g. garbage disposal
  - h. ice makers
  - i. dishwashers
  - j. water heaters
- 20.03 Install backflow assemblies as required.
- 20.04 Test and inspect the final installation.

21.0 DEMONSTRATE POSITIVE CUSTOMER-RELATIONS SKILLS--The student will be able to:

- 21.01 Organize and plan multiple tasks, utilizing various resources such as time, personnel, and materials.
- 21.02 Analyze problems, identify the causes, and devise plans of action.
- 21.03 Identify obstacles, generate alternatives, and choose the best alternatives.
- 21.04 Create new and better ways to perform tasks, applying the latest ideas to putting work in place.
- 21.05 Explain the nature of the problem(s) and the remedial action(s) needed and advise the customer on preventive maintenance in a professional manner.
- 21.06 Resolve customer complaints in a positive, professional manner.
- 21.07 Prepare a job ticket.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721650
Course Title: Plumbing Technology 8
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with competencies in the installation of hot-water-heating-and-circulating systems and the principles of backflow and cross-connection control.

22.0 DEMONSTRATE A KNOWLEDGE OF THE PROCESS OF INSTALLING HOT-WATER-HEATING-AND-CIRCULATING SYSTEMS--The student will be able to:

- 22.01 Explain the basic theory of domestic hot-water-heating-and-circulating systems.
- 22.02 Design, size, and lay out a system.
- 22.03 Identify the equipment and materials needed for the job in accordance with job specifications and plumbing codes.
- 22.04 Install a distribution system.
- 22.05 Install equipment controls and safety devices.
- 22.06 Test and inspect the system.

25.0 DEMONSTRATE AN UNDERSTANDING OF THE PRINCIPLES OF BACKFLOW AND CROSS-CONNECTION CONTROL--The student will be able to:

- 25.01 Define backflow and cross-connection control.
- 25.02 Describe the importance of backflow and cross-connection control to the health of the public.
- 25.03 Identify the proper devices and assemblies for individual applications.
- 25.04 Explain the "degree of hazard" principle and how it relates to the installation of devices and assemblies.

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July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721660
Course Title: Plumbing Technology 9
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with competencies in the installation of interceptors and separators.

23.0 DEMONSTRATE A KNOWLEDGE OF THE PROCESS OF INSTALLING INTERCEPTORS AND SEPARATORS--The student will be able to:

- 23.01 Identify and explain various types of interceptors and separators.
- 23.02 Explain the theory and function of various interceptors and separators.
- 23.03 Istall and maintain:
  - a. lint traps and grease traps
  - b. gas and oil separators
  - c. sand and sediment interceptors

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721670
Course Title: Plumbing Technology 10
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with competencies necessary to install a storm-drainage system.

24.0 DEMONSTRATE A KNOWLEDGE OF THE PROCESS OF INSTALLING A STORM-DRAINAGE SYSTEM--The student will be able to:

- 24.01 Explain the theory of roof drains, leaders, and the storm-drainage system.
- 24.02 Size and lay out a storm-drainage system.
- 24.03 Identify and select the materials needed to install a storm-drainage system in accordance with job specifications and plumbing codes.
- 24.04 Lay out a job on site according to job specifications and plumbing codes, coordinating with other trades.
- 24.05 Install distribution systems.
- 24.06 Install roof drains, leaders, and drainage systems.
- 24.07 Test, balance, and inspect the systems.

July 1997

Florida Department of Education
INTENDED OUTCOMES

Program Title: Fire Sprinkler Systems Technology Program

	Secondary	PSAV
Program Numbers	**8721800**	**I460512**
CIP Number	0646.050202	0646.050202
Grade Level	9-12,30,31	30-31
Length	9 Credits	1350 Hours
Certification	PLUMBIN @7 G	PLUMBIN @7 G
Basic Skills		
Math		9
Language		9
Reading		9

INTENDED OUTCOMES: After successfully completing the appropriate course(s) for each occupational completion point of this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A
FIRE SPRINKLER INSTALLER HELPER - Industry Title

01.1 Describe career and training opportunities in the pipe-trade industry.
02.0 Demonstrate a basic knowledge of the pipe-trade industry.
03.0 Identify the use and care of basic tools in the pipe-trade industry.
04.0 Identify safe working conditions and observe safety precautions.
05.0 Apply pipe-trade-related basic math.
06.0 Demonstrate an understanding of basic science.
07.0 Read and interpret blueprints and job specifications.
08.0 Read and interupt basic pipe-trade codes.
09.0 Demonstrate employability skills.
10.0 Demonstrate communication skills.
11.0 Demonstrate an understanding of entrepreneurship.
12.0 Demonstrate positive human-relations skills.
13.0 Demonstrate a basic knowledge of fire-sprinkler systems.
14.0 Perform pipe-joining skills.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
FIRE SPRINKLER SYSTEM INSTALLER - Industry Title

15.0 Read and interrupt fire-sprinkler blueprints and specifications.
16.0 Install underground.
17.0 Trim out a fire-sprinkler system.
18.0 Repair, service, and maintain fire-sprinkler systems.
19.0 Demonstrate a knowledge of fire protection.
20.0 Apply the knowledge of water-supply requirements for a fire-sprinkler system.
21.0 Demonstrate the installation of a wet system.
22.0 Demonstrate the installation of a dry system.
23.0 Demonstrate the installation of preaction and deluge systems.

24.0 Demonstrate the installation of a combined dry-pipe and preaction system.

25.0 Demonstrate the installation of an antifreeze system.

26.0 Demonstrate the installation of a standpipe system.

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July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Fire Sprinkler Systems Technology
Secondary Number: 8721800
Postsecondary Number: I460513

OCCUPATIONAL COMPLETION POINT - DATA CODE A
FIRE SPRINKLER INSTALLER HELPER - Industry Title

01.0 DESCRIBE CAREER AND TRAINING OPPORTUNITIES IN THE PIPE-TRADE INDUSTRY--The student will be able to:

- 01.01 Obtain information on current and future job opportunities in the pipe-trade industry and discuss its trends.
- 01.02 Describe career ladders (entry-, intermediate-, and technical-level careers) in each of the pipe-trade industries and preparation requirements.
- 01.03 Describe advanced-training opportunities, including apprenticeship programs in each of the pipe-trade-industry programs.

02.0 DEMONSTRATE A BASIC KNOWLEDGE OF THE PIPE-TRADE INDUSTRY--The student will be able to:

- 02.01 Discuss the history of pipe trades.
- 02.02 Identify pipes, fittings, materials, and equipment related to the pipe trades.
- 02.03 Identify fixtures and appliances for plumbing, fire-sprinkler fitting, pipe fitting, and gas fitting jobs.
- 02.04 Define the terms used in the pipe-trade industry.

03.0 IDENTIFY THE USE AND CARE OF BASIC TOOLS IN THE PIPE-TRADE INDUSTRY--The student will be able to:

- 03.01 Identify and use the basic tools, equipment, and materials of the pipe-trade industry.
- 03.02 Demonstrate the procedures/techniques for the selection, use, care ans storage of tools and equipmrnt.
- 03.03 Compare the various tools used for plumbing, fire-sprinkler fitting, and pipe fitting.
- 03.04 Identify tools and equipment and the safety hazards associated with them.

04.0 IDENTIFY SAFE WORKING CONDITIONS AND OBSERVE SAFETY PRECAUTIONS--The student will be able to:

- 04.01 Explain the importance of following safety precautions when working in the pipe-trade industry.
- 04.02 Observe safety precautions.
- 04.03 Identify safe working practices and safe working conditions in the pipe-trade industry.
- 04.04 Demonstrate cardiopulmonary resuscitation (CPR) techniques.

04.05 Demonstrate an understanding of when and how to use first aid.

05.0 APPLY PIPE-TRADE-RELATED BASIC MATH--The student will be able to:

05.01 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
05.02 Measure tolerances on horizontal and vertical surfaces, using millimeters, centimeters, feet, and inches.
05.03 Solve pipe-trade-related basic math problems, such as piping offset and metric conversion.
05.04 Calculate material length and bend pipe by hand or with a pipe-bending machine and tools.

06.0 DEMONSTRATE AN UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

06.01 Describe molecular action as a result of temperature and pressure extremes, chemical reaction, and moisture content.
06.02 Draw conclusions or make inferences from data, such as temperature or pressure conversion.
06.03 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and describe the proper precautions for handling such materials.
06.04 Discuss environmental concerns related to hazardous waste and chemical disposal.
06.05 Explain pressure measurement in terms of pounds per square inch (PSI), inches of mercury, and KPA.
06.06 Explain how to use alternating-current meters and instruments in the pipe trades.

07.0 READ AND INTERPRET BLUEPRINTS AND JOB SPECIFICATIONS--The student will be able to:

07.01 Read and interpret measuring devices.
07.02 Draw and interpret basic isometric sketches.
07.03 Identify the basic symbols used in the pipe trades.
07.04 Read and interpret manufacturers' schematics and specifications.

08.0 READ AND INTERPRET BASIC PIPE-TRADE CODES--The student will be able to:

08.01 Describe the importance of following the local, state, and national codes for plumbing, fire-sprinkler fitting, gas fitting, and pipe fitting.
08.02 Read and interpret basic building codes in the pipe-trade industry.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

09.01 Conduct a job search and identify advanced-training opportunities, including an apprenticeship program.
09.02 Secure information about a job.
09.03 Identify documents that may be required for an application for a job or an apprenticeship program.

09.04 Complete a job-application form.
09.05 Demonstrate competence in job-interview techniques.
09.06 Demonstrate productive work habits and positive attitudes.
09.07 Demonstrate a knowledge of how to make job changes appropriately.
09.08 Identify the ethical and responsible practices expected of pipe-trade-industry employees.
09.09 Demonstrate acceptable personal-hygiene habits and a professional appearance.
09.10 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
09.11 Explain the importance of taking pride in the quality of work performed.
09.12 Describe the importance of a drug-free workplace and the industry's policies toward drug use.
09.13 Describe the importance of maintaining a good driver's record and the ramifications of a poor driving record on employment opportunities.
09.14 Describe "Florida's Right-to-Know" Law as recorded in the Florida Statutes, Chapter 442.

10.0 DEMONSTRATE COMMUNICATION SKILLS--The student will be able to:

10.01 Ask and answer questions coherently and concisely.
10.02 Read and follow written instructions and listen to and follow oral instructions.
10.03 Give reports orally and in writing.
10.04 Read and interpret reading materials related to the pipe-trade industry.
10.05 Find information in technical literature such as a manufacturer's manual.
10.06 Read and interpret graphs, charts, diagrams, and tables commonly used in the pipe-trade industry/occupation area.
10.07 Write logical and understandable statements or phrases, and accurately fill out the forms/invoices commonly used in the pipe-trade industry.
10.08 Communicate job-related information and coordinate with other trades.
10.09 Demonstrate appropriate telephone communication skills.
10.10 Demonstrate trade-related computer skills.

11.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

11.01 Define "entrepreneurship."
11.02 Describe the importance of entrepreneurship to the American economy and the role of small business in the free-enterprise system.
11.03 Discuss the advantages and disadvantages of business ownership.
11.04 Discuss the risks involved in the ownership of a business.
11.05 Identify the personal characteristics of a successful entrepreneur.
11.06 Identify the business skills, including computer skills, needed to operate a business efficiently and effectively.

12.0 DEMONSTRATE POSITIVE HUMAN-RELATIONS SKILLS--The student will be able to:

12.01 Exercise self-control.
12.02 Identify and demonstrate appropriate responses to criticism.
12.03 Recognize basic human-relations skills as they relate to success in the pipe-trade industry.
12.04 Resolve customer complaints in a positive, professional manner.

13.0 DEMONSTRATE A BASIC KNOWLEDGE OF FIRE-SPRINKLER SYSTEMS--The student will be able to:

13.01 Explain the basic theory and principles of fire protection.
13.02 Identify fire-sprinkler components.
13.03 Read, interpret, and comply with the manufacturers' schematics and specifications of fire-sprinkler devices.

14.0 PERFORM PIPE-JOINING SKILLS--The student will be able to:

14.01 Cut plastic pipe.
14.02 Join plastic pipe, using the adaptor-solvent cement method.
14.03 Bend steel pipe with a heavy-duty bending tool and with a chain vice and torch.
14.04 Cut steel pipe with a one-wheel and with a four-wheel steel-pipe cutter.
14.05 Join plastic pipe to steel pipe.
14.06 Thread steel pipe with an adjustable diestock, with a non-adjustable diestock, and with a power-driven vise stand.
14.07 Groove steel pipe with a pipe-driven grooving machine.
14.08 Join groove pipe with grooved couplings and fittings.
14.09 Cut copper tubing or pipe with a hacksaw and with a tubing cutter.
14.10 Bend copper tubing or pipe with a bender.
14.11 Join copper tubing to copper pipe, to brass pipe, to steel pipe, and to plastic pipe.
14.12 Cut ductile iron.
14.13 Join ductile and mechanical joints to fit.
14.14 Join steel pipe to ductile pipe.
14.15 Join plastic pipe to ductile pipe.
14.16 Braze pipe with a gas torch and filler metal.
14.17 Weld pipe with an oxyacetylene torch and filler metal.
14.18 Join pipe with an electric arc welder and filler metal.

OCCUPATIONAL COMPLETION POINT - DATA CODE B
FIRE SPRINKLER SYSTEM INSTALLER - Industry Title

15.0 READ AND INTERPRET FIRE-SPRINKLER BLUEPRINTS AND SPECIFICATIONS--The student will be able to:

15.01 Interpret measuring devices used for fire-sprinkler applications.
15.02 Identify and define basic fire-protection symbols.
15.03 Read and interpret a bill of lading for materials.

15.04 Read and interpret fire-sprinkler blueprints and specifications.
15.05 Read and interpret an architect's and an engineer's scale.

16.0 INSTALL UNDERGROUND--The student will be able to:

16.01 Lay out a job on site.
16.02 Install water-distribution systems.
16.03 Flush underground mains.
16.04 Conduct a hydrostatic test.
16.05 Complete test forms.

17.0 TRIM OUT A FIRE-SPRINKLER SYSTEM--The student will be able to:

17.01 Install and trim out the components of a fire-sprinkler system.
17.02 Test and inspect the final installation.

18.0 REPAIR, SERVICE, AND MAINTAIN FIRE-SPRINKLER SYSTEMS--The student will be able to:

18.01 Establish positive customer relations.
18.02 Troubleshoot and diagnose systems.
18.03 Determine alternative solutions.
18.04 Repair fire-sprinkler systems.
18.05 Repair leaks.
18.06 Repair or replace components.
18.07 Test and inspect repaired systems.
18.08 Prepare a job ticket.
18.09 Price a job, including the correct purchase price and sales tax, and write the invoice.
18.10 Collect payments for services rendered.

19.0 DEMONSTRATE A KNOWLEDGE OF FIRE PROTECTION--The student will be able to:

19.01 Explain the purpose of fire protection.
19.02 Apply the basic theory and principles of fire-protection codes.
19.03 Read, locate, and interpret information in the fire code.
19.04 Define and explain the terms used in the fire code.
19.05 Explain why the code may supersede manufacturers' specifications on products.

20.0 APPLY THE KNOWLEDGE OF WATER-SUPPLY REQUIREMENTS FOR A FIRE-SPRINKLER SYSTEM--The student will be able to:

20.01 Conduct a flow test.
20.02 Identify and explain the source of the water supply.
20.03 Obtain the water department's approval for underground connections.
20.04 Identify the requirements of backflow prevention and testing.
20.05 Differentiate the various types of water-supply connections.
20.06 Analyze water-supply requirements for hydraulically designed systems.

21.0 DEMONSTRATE THE INSTALLATION OF A WET SYSTEM--The student will be able to:

21.01 Discuss the advantages and disadvantages of wet systems.
21.02 Identify and explain the types of check and control valves used in wet systems.
21.03 Place check and control valves at the correct location.
21.04 Determine the causes of unsatisfactory performance in a wet system.
21.05 Identify and explain the various hazards in which wet systems are installed.
21.06 Identify spacing, location, and position sprinklers.
21.07 Size a small wet pipe system (4,000 square feet), using the pipe schedule tables.
21.08 Discuss the advantages of a hydraulically designed wet system.
21.09 Demonstrate the installation of a wet system.
21.10 Test a wet system.

22.0 DEMONSTRATE THE INSTALLATION OF A DRY SYSTEM--The student will be able to:

22.01 Discuss the advantages and disadvantages of a dry system.
22.02 Identify and explain the types of check and control valves used in dry systems.
22.03 Place check and control valves at correct locations.
22.04 Determine the causes of unsatisfactory performance in a dry system.
22.05 Identify and describe the hazardous conditions in which dry systems are installed.
22.06 Identify the spacing, location, and position of sprinklers.
22.07 Identify the recommended capacity of a dry pipe system in U.S. gallons.
22.08 Discuss the advantages of a hydraulically designed dry system.
22.09 Identify the maximum time required for water to reach a remote inspector test.
22.10 Describe and demonstrate the methods of charging a dry system.
22.11 Describe the proper drainage of a dry pipe system.
22.12 Demonstrate the installation of a dry system.
22.13 Test a dry system.

23.0 DEMONSTRATE THE INSTALLATION OF PREACTION AND DELUGE SYSTEMS--The student will be able to:

23.01 Discuss the advantages and disadvantages of preaction and deluge systems.
23.02 Identify the types of check and control valves used in preaction and deluge systems.
23.03 Place check and control valves at the correct location.
23.04 Determine the causes of unsatisfactory performance.
23.05 Identify the various hazardous conditions in which preaction and deluge systems are installed.
23.06 Identify the spacing, location, and position of sprinklers.
23.07 Discuss the advantages of a hydraulically designed preaction and deluge system.

23.08 Describe the various types of preaction and deluge systems.
23.09 Identify and explain the various types of supplemental detection systems.
23.10 Install preaction and deluge systems.
23.11 Test preaction and deluge systems.

24.0 DEMONSTRATE THE INSTALLATION OF A COMBINED DRY PIPE AND PREACTION SYSTEM--The student will be able to:

24.01 Discuss the advantages and disadvantages of a combined system.
24.02 Identify and explain the types of check and control valves in a combined system.
24.03 Place check and control valves at the correct location.
24.04 Determine the cause of unsatisfactory performance in a combined system.
24.05 Identify and explain the hazardous conditions in which a combined system is installed.
24.06 Identify the spacing, location, and position of sprinklers.
24.07 Discuss the advantages of a hydraulically designed combined system.
24.08 Demonstrate the installation of a combined dry pipe and preaction system.
24.09 Test a combined system.
24.10 Define and explain a NFPA (National Fire Protection Association) combined system.

25.0 DEMONSTRATE THE INSTALLATION OF AN ANTIFREEZE SYSTEM--The student will be able to:

25.01 Discuss the advantages and disadvantages of the antifreeze system.
25.02 Differentiate various types of antifreeze solution.
25.03 Test an antifreeze solution.
25.04 Identify the purpose and procedures of installing an antifreeze loop.
25.05 Install an antifreeze system.
25.06 Test an antifreeze system.

26.0 DEMONSTRATE THE INSTALLATION OF A STANDPIPE SYSTEM--The student will be able to:

26.01 Determine the need for a standpipe system.
26.02 Determine the standpipe sizing and number required according to the NFPA 14 standard book.
26.03 Identify the standpipe classification according to the building design.
26.04 Identify the locations and methods of sectionalizing standpipe.
26.05 Determine the GPM (gallons per minute) required for a standpipe system.
26.06 Differentiate various pressure-reducing devices and describe how to use them.
26.07 Install a standpipe system.
26.08 Test the standpipe system.
26.09 Conduct a standpipe flow test.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8720001
Course Title: Introduction to Pipe Trades 1
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to pipe trades. These competencies relate to career and training opportunities, the use and care of tools, safety precautions, basic-math applications, standards and codes, and human relations.

01.0 DESCRIBE CAREER AND TRAINING OPPORTUNITIES IN THE PIPE-TRADE INDUSTRY--The student will be able to:

- 01.01 Obtain information on current and future job opportunities in the pipe-trade industry. and discuss its trends.
- 01.02 Describe career ladders (entry-, intermediate-, and technical-level careers) in each of the pipe-trade-industry programs and preparation requirements.
- 01.03 Describe advanced-training opportunities, including apprenticeship programs in each of the pipe-trade-industry programs.

02.0 DEMONSTRATE A BASIC KNOWLEDGE OF THE PIPE-TRADE INDUSTRY--The student will be able to:

- 02.01 Discuss the history of pipe trades.
- 02.02 Identify pipes, fittings, materials, and equipment related to pipe trades.
- 02.03 Identify fixtures and appliances for plumbing, fire-sprinkler fitting, pipe fitting, and gas fitting jobs.
- 02.04 Define the terms used in the pipe-trade industry.

03.0 IDENTIFY THE USE AND CARE OF BASIC TOOLS IN THE PIPE-TRADE INDUSTRY--The student will be able to:

- 03.01 Identify and use the basic tools, equipment, and materials of the pipe-trade industry.
- 03.02 Demonstrate the procedures/techniques for the selection, use, care and storage of tools and equipment.
- 03.03 Compare the various tools used for plumbing, fire-sprinkler fitting, and pipe fitting.
- 03.04 Identify tools and equipment and the safety hazards associated with them.

04.0 IDENTIFY SAFE WORKING CONDITIONS AND OBSERVE SAFETY PRECAUTIONS--The student will be able to:

04.01 Explain the importance of following safety precautions when working in the pipe-trade industry.
04.02 Observe safety precautions.
04.03 Identify safe working practices and safe working conditions in the pipe-trade industry.

05.0 APPLY PIPE-TRADE-RELATED BASIC MATH--The student will be able to:

05.01 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
05.02 Measure tolerances on horizontal and vertical surfaces, using millimeters, centimeters, feet, and inches.

08.0 READ AND INTERPRET BASIC PIPE-TRADE CODES--The student will be able to:

08.01 Describe the importance of following the local, state, and national codes for plumbing, fire-sprinkler fitting, gas fitting, and/or pipe fitting.

12.0 DEMONSTRATE POSITIVE HUMAN-RELATIONS SKILLS--The student will be able to:

12.01 Exercise self-control.
12.02 Identify and demonstrate appropriate responses to criticism.
12.03 Recognize basic human-relations skills as they relate to success in the pipe-trade industry.
12.04 Resolve conflicts in a positive, professional manner.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8720002
Course Title: Introduction to Pipe Trades 2
Course Credit: 1

COURSE DESCRIPTION:

The purpose of this course is to develop the competencies essential to pipe trades. These competencies relate to safety, pipe-trade-related math applications, basic science, standards and codes, employability skills, and communication.

04.0 IDENTIFY SAFE WORKING CONDITIONS AND OBSERVE SAFETY PRECAUTIONS--The student will be able to:

04.04 Demonstrate cardiopulmonary resuscitation (CPR) techniques.
04.05 Demonstrate an understanding of when and how to use first aid.

05.0 APPLY PIPE-TRADE-RELATED BASIC MATH--The student will be able to:

05.03 Solve pipe-trade-related basic math problems, such as piping offset and metric conversion.
05.04 Calculate material length and bend pipe by hand or with a pipe-bending machine and tools.

06.0 DEMONSTRATE AN UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

06.01 Describe molecular action as a result of temperature and pressure extremes, chemical reaction, and moisture content.
06.02 Draw conclusions or make inferences from data, such as temperature or pressure conversion.
06.03 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and describe the proper precautions for handling such materials.
06.04 Discuss environmental concerns related to hazardous waste and chemical disposal.
06.05 Explain pressure measurement in terms of pounds per square inch (PSI) and inches of mercury.
06.06 Explain how to use alternating-current meters and instruments in the pipe trades.

08.0 READ AND INTERPRET BASIC PIPE-TRADE CODES--The student will be able to:

08.02 Read and interpret current standards and codes for plumbing, fire-sprinkler fitting, gas fitting, and/or pipe fitting.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

09.01 Demonstrate productive work habits and positive attitudes.

09.02 Identify the ethical and responsible practices expected of pipe-trade-industry employees.

09.03 Demonstrate acceptable personal-hygiene habits and a professional appearance.

09.04 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.

09.05 Explain the importance of taking pride in the quality of work performed.

09.06 Describe the importance of a drug-free workplace and the industry's policies toward drug use.

09.07 Describe the importance of maintaining a good driver's record and the ramifications of a poor driving record on employment opportunities.

09.08 Describe "Florida's Right-to-Know" Law as recorded in the Florida Statutes, Chapter 442.

10.0 DEMONSTRATE COMMUNICATION SKILLS--The student will be able to:

10.01 Ask and answer questions coherently and concisely.

10.02 Read and follow written instructions and listen to and follow oral instructions.

10.03 Give reports orally and in writing.

10.04 Read and interpret reading materials related to the pipe-trade industry.

10.05 Find information in technical literature such as a manufacturer's manual.

10.06 Read and interpret graphs, charts, diagrams, and tables commonly used in the pipe-trade industry/occupation area.

10.07 Write logical and understandable statements or phrases, and accurately fill out the forms/invoices commonly used in the pipe-trade industry.

10.08 Communicate job-related information and coordinate with other trades.

10.09 Demonstrate appropriate telephone communication skills.

10.10 Demonstrate trade-related computer skills.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8720003
Course Title: Introduction to Pipe Trades 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with competencies relating to blueprint and job specifications, building codes in the pipe trades, employability skills, and entrepreneurship.

07.0 READ AND INTERPRET BLUEPRINTS AND JOB SPECIFICATIONS--The student will be able to:

- 07.01 Read and interpret measuring devices.
- 07.02 Draw and interpret basic isometric sketches.
- 07.03 Identify the basic symbols used in the pipe trades.
- 07.04 Read and interpret manufacturers' schematics and specifications.

08.0 READ AND INTERPRET BASIC PIPE-TRADE CODES--The student will be able to:

- 08.03 Read and interpret basic building codes in the pipe-trade industry.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 09.09 Conduct a job search and identify advanced-training opportunities, including an apprenticeship program.
- 09.10 Secure information about a job.
- 09.11 Identify documents that may be required for an application for a job or an apprenticeship program.
- 09.12 Complete a job-application form.
- 09.13 Demonstrate competence in job-interview techniques.
- 09.14 Demonstrate a knowledge of how to make job changes appropriately.

11.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 11.01 Define "entrepreneurship."
- 11.02 Describe the importance of entrepreneurship to the American economy and the role of small business in the free-enterprise system.
- 11.03 Discuss the advantages and disadvantages of business ownership.
- 11.04 Discuss the risks involved in the ownership of a business.
- 11.05 Identify the personal characteristics of a successful entrepreneur.
- 11.06 Identify the business skills, including computer skills, needed to operate a business efficiently and effectively.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721810
Course Title: Fire Sprinkler Systems Technology 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with knowledge and skills in fire-sprinkler systems and pipe-joining.

13.0 DEMONSTRATE A BASIC KNOWLEDGE OF FIRE-SPRINKLER SYSTEMS--The student will be able to:

- 13.01 Explain the basic theory and principles of fire protection.
- 13.02 Identify fire-sprinkler components.
- 13.03 Read, interpret, and comply with the manufacturers' schematics and specifications of fire-sprinkler devices.

14.0 PERFORM PIPE-JOINING SKILLS--The student will be able to:

- 14.01 Cut plastic pipe.
- 14.02 Join plastic pipe, using the adaptor-solvent cement method.
- 14.03 Bend steel pipe with a heavy-duty bending tool and with a chain vice and torch.
- 14.04 Cut steel pipe with a one-wheel and with a four-wheel steel-pipe cutter.
- 14.05 Join plastic pipe to steel pipe.
- 14.06 Thread steel pipe with an adjustable diestock, with a non-adjustable diestock, and with a power-driven vise stand.
- 14.07 Groove steel pipe with a pipe-driven grooving machine.
- 14.08 Join groove pipe with grooved couplings and fittings.
- 14.09 Cut copper tubing or pipe with a hacksaw and with a tubing cutter.
- 14.10 Bend copper tubing or pipe with a bender.
- 14.11 Join copper tubing to copper pipe, to brass pipe, to steel pipe, and to plastic pipe.
- 14.12 Cut ductile iron.
- 14.13 Join ductile and mechanical joints to fit.
- 14.14 Join steel pipe to ductile pipe.
- 14.15 Join plastic pipe to ductile pipe.
- 14.16 Braze pipe with a gas torch and filler metal.
- 14.17 Weld pipe with an oxyacetylene torch and filler metal.
- 14.18 Join pipe with an electric arc welder and filler metal.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721820
Course Title: Fire Sprinkler Systems Technology 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with competencies related to blueprints and specifications, underground installation, fire-sprinkler-system installation, and fire protection.

15.0 READ AND INTERPRET FIRE-SPRINKLER BLUEPRINTS AND SPECIFICATIONS--The student will be able to:

- 15.01 Interpret measuring devices used for fire-sprinkler applications.
- 15.02 Identify and define basic fire-protection symbols.
- 15.03 Read and interpret a bill of lading for materials.

16.0 INSTALL UNDERGROUND--The student will be able to:

- 16.01 Lay out a job on site.
- 16.02 Install water-distribution systems.
- 16.03 Flush underground mains.
- 16.04 Conduct a hydrostatic test.
- 16.05 Complete test forms.

17.0 TRIM OUT A FIRE-SPRINKLER SYSTEM--The student will be able to:

- 17.01 Install and trim out the components of a fire-sprinkler system.
- 17.02 Test and inspect the final installation.

19.0 DEMONSTRATE A KNOWLEDGE OF FIRE PROTECTION--The student will be able to:

- 19.01 Explain the purpose of fire protection.
- 19.02 Apply the basic theory and principles of fire-protection codes.
- 19.03 Read, locate, and interpret information in the fire code.
- 19.04 Define and explain the terms used in the fire code.
- 19.05 Explain why the code may supersede manufacturers' specifications on products.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721830
Course Title: Fire Sprinkler Systems Technology 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with competencies relating to water-supply requirements for fire-sprinkler systems and to the installation of wet and dry systems.

20.0 APPLY THE KNOWLEDGE OF WATER-SUPPLY REQUIREMENTS FOR A FIRE-SPRINKLER SYSTEM--The student will be able to:

- 20.01 Conduct a flow test.
- 20.02 Identify and explain the source of the water supply.
- 20.03 Obtain the water department's approval for underground connections.
- 20.04 Identify the requirements of backflow prevention and testing.
- 20.05 Differentiate the various types of water-supply connections.
- 20.06 Analyze water-supply requirements for hydraulically designed systems.

21.0 DEMONSTRATE THE INSTALLATION OF A WET SYSTEM--The student will be able to:

- 21.01 Discuss the advantages and disadvantages of wet systems.
- 21.02 Identify and explain the types of check and control valves used in wet systems.
- 21.03 Place check and control valves at the correct location.
- 21.04 Determine the causes of unsatisfactory performance in a wet system.
- 21.05 Identify and explain the various hazards in which wet systems are installed.
- 21.06 Identify spacing, location, and position sprinklers.
- 21.07 Size a small wet pipe system (4,000 square feet), using the pipe schedule tables.
- 21.08 Discuss the advantages of a hydraulically designed wet system.
- 21.09 Demonstrate the installation of a wet system.
- 21.10 Test a wet system.

22.0 DEMONSTRATE THE INSTALLATION OF A DRY SYSTEM--The student will be able to:

- 22.01 Discuss the advantages and disadvantages of a dry system.
- 22.02 Identify and explain the types of check and control valves used in dry systems.
- 22.03 Place check and control valves at correct locations.
- 22.04 Determine the causes of unsatisfactory performance in a dry system.

22.05 Identify and describe the hazardous conditions in which dry systems are installed.
22.06 Identify the spacing, location, and position of sprinklers.
22.07 Identify the recommended capacity of a dry pipe system in U.S. gallons.
22.08 Discuss the advantages of a hydraulically designed dry system.
22.09 Identify the maximum time required for water to reach a remote inspector test.
22.10 Describe and demonstrate the methods of charging a dry system.
22.11 Describe the proper drainage of a dry pipe system.
22.12 Demonstrate the installation of a dry system.
22.13 Test a dry system.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721840
Course Title: Fire Sprinkler Systems Technology 7
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with competencies in blueprint interpretation and the installation of preaction and deluge systems.

15.0 READ AND INTERPRET FIRE-SPRINKLER BLUEPRINTS AND SPECIFICATIONS--The student will be able to:

- 15.03 Read and interpret a bill of lading for materials.
- 15.04 Read and interpret fire-sprinkler blueprints and specifications.
- 15.05 Read and interpret an architect's and an engineer's scale.

23.0 DEMONSTRATE THE INSTALLATION OF PREACTION AND DELUGE SYSTEMS--The student will be able to:

- 23.01 Discuss the advantages and disadvantages of preaction and deluge systems.
- 23.02 Identify the types of check and control valves used in preaction and deluge systems.
- 23.03 Place check and control valves at the correct location.
- 23.04 Determine the causes of unsatisfactory performance.
- 23.05 Identify the various hazardous conditions in which preaction and deluge systems are installed.
- 23.06 Identify the spacing, location, and position of sprinklers.
- 23.07 Discuss the advantages of a hydraulically designed preaction and deluge system.
- 23.08 Describe the various types of preaction and deluge systems.
- 23.09 Identify and explain the various types of supplemental detection systems.
- 23.10 Install preaction and deluge systems.
- 23.11 Test preaction and deluge systems.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721850
Course Title: Fire Sprinkler Systems Technology 8
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with competencies in the installation of a combined dry pipe and preaction system and of a standpipe system.

24.0 DEMONSTRATE THE INSTALLATION OF A COMBINED DRY PIPE AND PREACTION SYSTEM--The student will be able to:

- 24.01 Discuss the advantages and disadvantages of a combined system.
- 24.02 Identify and explain the types of check and control valves in a combined system.
- 24.03 Place check and control valves at the correct location.
- 24.04 Determine the cause of unsatisfactory performance in a combined system.
- 24.05 Identify and explain the hazardous conditions in which a combined system is installed.
- 24.06 Identify the spacing, location, and position of sprinklers.
- 24.07 Discuss the advantages of a hydraulically designed combined system.
- 24.08 Demonstrate the installation of a combined dry pipe and preaction system.
- 24.09 Test a combined system.
- 24.10 Define and explain a NFPA (National Fire Protection Association) combined system.

26.0 DEMONSTRATE THE INSTALLATION OF A STANDPIPE SYSTEM--The student will be able to:

- 26.01 Determine the need for a standpipe system.
- 26.02 Determine the standpipe sizing and number required according to the NFPA 14 standard book.
- 26.03 Identify the standpipe classification according to the building design.
- 26.04 Identify the locations and methods of sectionalizing standpipe.
- 26.05 Determine the GPM (gallons per minute) required for a standpipe system.
- 26.06 Differentiate various pressure-reducing devices and describe how to use them.
- 26.07 Install a standpipe system.
- 26.08 Test the standpipe system.
- 26.09 Conduct a standpipe flow test.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8721860
Course Title: Fire Sprinkler Systems Technology 9
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide students with competencies in the installation of a antifreeze system and in the repair, servicing, and maintenance of fire-sprinkler systems.

18.0 REPAIR, SERVICE, AND MAINTAIN FIRE-SPRINKLER SYSTEMS--The student will be able to:

- 18.01 Establish positive customer relations.
- 18.02 Troubleshoot and diagnose systems.
- 18.03 Determine alternative solutions.
- 18.04 Repair fire-sprinkler systems.
- 18.05 Repair leaks.
- 18.06 Repair or replace components.
- 18.07 Test and inspect repaired systems.
- 18.08 Prepare a job ticket.
- 18.09 Price a job, including the correct purchase price and sales tax, and write the invoice.
- 18.10 Collect payments for services rendered.

25.0 DEMONSTRATE THE INSTALLATION OF AN ANTIFREEZE SYSTEM--The student will be able to:

- 25.01 Discuss the advantages and disadvantages of the antifreeze system.
- 25.02 Differentiate various types of antifreeze solution.
- 25.03 Test an antifreeze solution.
- 25.04 Identify the purpose and procedures of installing an antifreeze loop.
- 25.05 Install an antifreeze system.
- 25.06 Test an antifreeze system.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Plastering
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I460409**
CIP Number	0646.040900
Grade Level	30, 31
Length	450 hours
Certification	TEC CONSTR ¶7 ¶G
	TROWEL TR @7 G
	BLDG CONST ¶7 ¶G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as plasterers and stucco masons (87317568), or to provide supplemental training for persons previously or currently employed in this occupation.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, mathematics, sketching, basic drafting, safety using scaffolds and ladders, preparation of surfaces and application of plaster and composition moldings.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Plastering industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in the application of plaster finishes and moldings to architectural surfaces.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 8.0, Language 8.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 450 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Read and interpret blueprints and schematics.
02.0 Identify and use materials and finishes.
03.0 Demonstrate proper use of tools, trestles, scaffolds and ladders.
04.0 Shape and apply moldings and cornices.
05.0 Make molds.
06.0 Apply plaster.
07.0 Align surfaces using plumb bob, straight edge and spirit level.
08.0 Create smooth finish surfaces.
09.0 Create decorative textures and special effects by spraying, brushing, troweling, stippling, or spattering small stones on surface.
10.0 Demonstrate appropriate communication skills.
11.0 Demonstrate appropriate math skills.
12.0 Demonstrate appropriate understanding of basic science.
13.0 Demonstrate employability skills.
14.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Plastering
Secondary Number:
Postsecondary Number: I460409

01.0 READ AND INTERPRET BLUEPRINTS AND SCHEMATICS--The student will be able to:

01.01 Identify building components using a blueprint.
01.02 Recognize commonly used symbols on blueprints
01.03 Produce finished surfaces in accordance to blueprints, or architect's drawings.

02.0 IDENTIFY AND USE MATERIALS AND FINISHES--The student will be able to:

02.01 Mix mortar.
02.02 Mix plaster to designated consistency.
02.03 Install driveit systems.
02.04 Apply hardcoat and putty coat finishes.

03.0 DEMONSTRATE PROPER USE OF TOOLS, TRESTLES, SCAFFOLDS AND LADDERS--The student will be able to:

03.01 Erect scaffolds.
03.02 Work off hod ladder.
03.03 Use measurement instruments and tools to determine dimensions.
03.04 Roughen undercoat with scratcher to provide bond.

04.0 SHAPE AND APPLY MOLDING AND CORNICES--The student will be able to:

04.01 Strike excess plaster.
04.02 Apply plaster using trowel and push template over plaster.
04.03 Apply coat of plaster to wall and press trim to position.
04.04 Mold and install ornamental plaster panels and trim.

05.0 MAKE MOLDS--The student will be able to:

05.01 Shape plaster using template.
05.02 Spread plaster with trowel when installing ornamental trim.

06.0 APPLY PLASTER--The student will be able to:

06.01 Apply scratch coat of plaster to metal or gypsum lath.
06.02 Apply brown coat of plaster to metal or gypsum lath.
06.03 Apply finish coat of plaster to metal or gypsum lath.
06.04 Spread plaster over lath or masonry base using trowel.
06.05 Apply plaster to interior walls.
06.06 Apply plaster to ceilings.

07.0 ALIGN SURFACES USING PLUMB BOB, STRAIGHT EDGE AND SPIRIT LEVEL--The student will be able to:

07.01 Smooth plaster with darby and float to attain uniform thickness.
07.02 Install fiber cornerites.

08.0 CREATE SMOOTH FINISH SURFACES--The student will be able to:

08.01 Produce finished surfaces following instruction.
08.02 Produce finished surfaces using handtools and portable power tools.

09.0 CREATE DECORATIVE TEXTURES AND SPECIAL EFFECTS BY SPRAYING, BRUSHING, TROWELING, STIPPLING, OR SPATTERING SMALL STONES ON SURFACES--The student will be able to:

09.01 Apply plaster with spray gun.
09.02 Spatter surface with small stones to create decorative textures in finish.
09.03 Mark surface of coat with brush and trowel to create decorative textures in finish.
09.04 Produce textured finished surfaces following directions.

10.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

10.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
10.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
10.03 Read and follow written and oral instructions.
10.04 Answer and ask questions coherently and concisely.
10.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
10.06 Demonstrate appropriate telephone/communication skills.

11.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

11.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
11.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
11.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
11.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
11.05 Demonstrate an understanding of federal, state and local taxes and their computation.

12.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

12.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

12.02 Draw conclusions or make inferences from data.
12.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
12.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

13.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

13.01 Conduct a job search.
13.02 Secure information about a job.
13.03 Identify documents which may be required when applying for a job interview.
13.04 Complete a job application form correctly.
13.05 Demonstrate competence in job interview techniques.
13.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
13.07 Identify acceptable work habits.
13.08 Demonstrate knowledge of how to make job changes appropriately.
13.09 Demonstrate acceptable employee health habits.
13.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

14.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

14.01 Define entrepreneurship.
14.02 Describe the importance of entrepreneurship to the American economy.
14.03 List the advantages and disadvantages of business ownership.
14.04 Identify the risks involved in ownership of a business.
14.05 Identify the necessary personal characteristics of a successful entrepreneur.
14.06 Identify the business skills needed to operate a small business efficiently and effectively.

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Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Practical, Technical And Industrial Occupations
Program Type:	Practical Arts
Occupational Area:	Industrial Education
Components:	N/A

	Secondary							
Program Numbers	**8700300**							
CIP Number	0646.9999PA							
Grade Level	9-12, 30, 31							
Length	1 Credit							
Certification	TEC CONSTR	@7	G		CARPENTRY	@7	G	
	GAS FITTER	@7	G		BLDG CONST	@7	G	
	APPLI REPR	@7	G		COMM COOK	@7	G	
	HOME EC	1	@2		QUAN FOOD	@7	G	
	VOC HME EC	@4			TEC ELEC	@7	G	
	AUTO MECH	@7	G		ELECTRONIC	@7	G	
	TEC MECH	@7	G		AUTO IND	@7	G	
	WELDING	@7	G		GAS ENG RPR	@7	G	
	AIR MECH	@7	G		METAL WORK	@7	G	
	SHEETMETAL	@7	G		AVIONICS	@7	G	
	TEC DRAFT	@7	G		DRAFTING	@7	G	
	BLDG MAINT	@7	G		ELECTRICAL	@7	G	
	RADIO TV	@7	G		DESEL MECH	@7	G	

NOTE: Certification coverage must relate to course taught.

Facility Code	244
VSO	VICA
Coop Method	No
Apprenticeship	No

I. **PURPOSE:** The purpose of this program is to provide individuals with practical knowledge, skills, and attitudes relating to an occupational cluster within the technical and industrial program area. This content will better prepare the student in the selection of vocational and academic course work.

The content includes, but is not limited to, an overview of the subject trade occupational concepts of occupations within that cluster, to include realistic knowledge and expectations of the work environment, career potential, requirement for and extent of basic skills (math, science, and communications), employability skills, job skills, interpretation of technical documentation, job safety and the proper utilization of hand and power tools. Hands-on projects pertinent to the studied occupations must be included to reinforce the study of related materials and processes.

Program requirements may be met by completing one (1) of the following practical courses. Credit awarded for this series of courses may not exceed one (1).

8700310 - Practical Appliance Service
8700320 - Practical Engine Mechanics
8700330 - Practical Construction Trades
8700340 - Practical Electrical/Electronics
8700350 - Practical Metal Work
8700360 - Practical Commercial Foods
8700370 - Practical Graphic Arts
8700380 - Practical Drafting
8700390 - Practical Aviation Careers

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Practical, Technical and Industrial Occupations industry; planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES**: Learning activities are provided in a laboratory. Hands-on experience with the tools, machines and materials used in the occupational cluster are required.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

This program enables individuals to achieve knowledge and practical competencies within an identified occupational cluster.

When a secondary student with a disability is enrolled in a vocational class with modifications to the curriculum framework, the particular outcomes and student performance standards which the student must master to earn credit must be specified in the student's individual educational plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate realistic knowledge of occupations, skills, and work environment within the occupational cluster associated with the course title of enrollment.
02.0 Demonstrate acceptable professional and personal sanitation practices.
03.0 Demonstrate safe working practices.
04.0 Demonstrate equipment operation skills.
05.0 Produce and interpret pertinent technical documentation.
06.0 Use units and measurements relating to subject occupations.
07.0 Construct projects or complete tasks.

08.0 Identify pertinent materials and processes.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate appropriate math skills.
11.0 Demonstrate an understanding of appropriate basic science.
12.0 Demonstrate employability skills in a laboratory environment.
13.0 Demonstrate an understanding of entrepreneurship.
14.0 Research employment and training opportunities and career potential.
15.0 Demonstrate team skills.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8700310
Course Title: Practical Appliance Service
Course Credit: 1

COURSE DESCRIPTION:

01.0 DEMONSTRATE REALISTIC KNOWLEDGE OF OCCUPATIONS, SKILLS, AND WORK ENVIRONMENT--The student will be able to:

- 01.01 Identify four service trades occupations.
- 01.02 Relate the types of duties required of workers in each of four service trades areas.
- 01.03 Describe the working conditions of workers in each of four service trades areas.

02.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--The student will be able to:

- 02.01 Demonstrate acceptable employee health habits.
- 02.02 Identify or demonstrate acceptable personal grooming habits.

03.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

- 03.01 Identify physical safety rules.
- 03.02 Identify physical safety hazards.
- 03.03 Recognize and correct or report physical safety hazards.
- 03.04 Identify electrical safety rules.
- 03.05 Identify electrical safety hazards.
- 03.06 Recognize and correct or report electrical safety hazards.
- 03.07 Identify fire safety rules.
- 03.08 Identify fire safety hazards.
- 03.09 Recognize and correct or report fire safety hazards.
- 03.10 Identify first aid requirements.

04.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

- 04.01 Follow safety rules and procedures.
- 04.02 Identify and properly use hand tools common to the service trades.
- 04.03 Following safety rules established for power equipment.
- 04.04 Safely use power equipment common to the service trades areas.

05.0 PRODUCE AND INTERPRET PERTINENT TECHNICAL DOCUMENTATION--The student will be able to:

- 05.01 Interpret various drawings and diagrams common to the service trades areas.
- 05.02 Use service manuals to match diagrams with given equipment needing repairs.

06.0 USE UNITS AND MEASUREMENTS RELATING TO SUBJECT OCCUPATIONS--The student will be able to:

06.01 Identify common service trades measurement tools.
06.02 Use measuring tools for a job specific to one of the service trades areas.
06.03 Use precision measuring tools common to one of the service trades.

07.0 CONSTRUCT PROJECTS OR COMPLETE TASKS--The student will be able to:

07.01 Complete an assigned task in appliance repair.
07.02 Complete an assigned task in customer relations.
07.03 Complete an assigned task in another service trade area.

08.0 IDENTIFY PERTINENT MATERIALS AND PROCESSES--The student will be able to:

08.01 Identify by name given service trades materials.
08.02 Identify the uses of given service trades materials.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.03 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.04 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.

11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Locate and select employment opportunities.
12.02 Understand employment capabilities.
12.03 Demonstrate employment seeking skills.
12.04 Demonstrate appropriate work behavior.
12.05 Project a professional image.
12.06 Work individually and cooperatively as a member of regular or culturally diverse team.
12.07 Balance personal and professional life.
12.08 Use and conserve resources and energy.
12.09 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes, Chapter 442.
12.10 Adapt to change.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 Identify the necessary personal characteristics of a successful entrepreneur.

14.0 USE EMPLOYABILITY SKILLS TO RESEARCH JOB AND TRAINING OPPORTUNITIES--The student will be able to:

14.01 List 3 ways to find a job in the service trades.
14.02 List 3 different local service trades job openings, the qualifications for each and the salary for each.
14.03 List the local training opportunities available in 3 or more service trades.

15.0 DEMONSTRATE TEAM SKILLS--The student will be able to:

15.01 Participate as a responsible "team member" during laboratory activities.
15.02 Work cooperatively with others.
15.03 Perform a role in the shop cleanup and housekeeping schedule.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8700320
Course Title: Practical Engine Mechanics
Course Credit: 1

COURSE DESCRIPTION:

01.0 DEMONSTRATE REALISTIC KNOWLEDGE OF OCCUPATIONS, SKILLS, AND WORK ENVIRONMENT--The student will be able to:

- 01.01 Identify three mechanics trades occupations.
- 01.02 Relate the types of duties required of workers in each of three mechanics trades areas.
- 01.03 Describe the working conditions of workers in each of three mechanics trades areas.

02.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--The student will be able to:

- 02.01 Demonstrate acceptable employee health habits.
- 02.02 Identify or demonstrate acceptable personal grooming habits.

03.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

- 03.01 Identify physical safety rules.
- 03.02 Identify physical safety hazards.
- 03.03 Recognize and correct or report physical safety hazards.
- 03.04 Identify electrical safety rules.
- 03.05 Identify electrical safety hazards.
- 03.06 Recognize and correct or report electrical safety hazards.
- 03.07 Identify fire safety rules.
- 03.08 Identify fire safety hazards.
- 03.09 Recognize and correct or report fire safety hazards.
- 03.10 Identify first aid requirements.

04.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

- 04.01 Follow safety rules and procedures.
- 04.02 Identify and properly use hand tools common to the mechanics trades.
- 04.03 Follow safety rules established for power equipment.
- 04.04 Safely use common mechanics trades power tools and equipment.

05.0 PRODUCE AND INTERPRET PERTINENT TECHNICAL DOCUMENTATION--The student will be able to:

- 05.01 Interpret mechanics trade drawings.
- 05.02 Interpret mechanics trade manuals.

06.0 USE UNITS AND MEASUREMENTS RELATING TO SUBJECT OCCUPATIONS--The student will be able to:

06.01 Identify common mechanics trades measuring tools.
06.02 Use measuring tools to measure a specific mechanics trade job.
06.03 Use mechanics trades precision measuring tools.

07.0 CONSTRUCT PROJECTS OR COMPLETE TASKS--The student will be able to:

07.01 Complete an assigned task in the auto mechanics area.
07.02 Complete an assigned task in the small gas engine area.
07.03 Complete an assigned task in another mechanics area.

08.0 IDENTIFY PERTINENT MATERIALS AND PROCESSES--The student will be able to:

08.01 Identify by name various mechanical parts.
08.02 Identify by use of parts catalogs the use of given mechanical parts.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.03 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.04 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Locate and select employment opportunities.
12.02 Understand employment capabilities.
12.03 Demonstrate employment seeking skills.
12.04 Demonstrate appropriate work behavior.
12.05 Project a professional image.
12.06 Work individually and cooperatively as a member of regular or culturally diverse team.
12.07 Balance personal and professional life.
12.08 Use and conserve resources and energy.
12.09 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes, Chapter 442.
12.10 Adapt to change.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 Identify the necessary personal characteristics of a successful entrepreneur.

14.0 USE EMPLOYABILITY SKILLS TO RESEARCH JOB AND TRAINING OPPORTUNITIES--The student will be able to:

14.01 List 3 ways to find a job in the mechanics trades.
14.02 List 3 different local mechanics trades job openings, the qualifications for each and the salary for each.
14.03 List the local training opportunities available in 3 or more mechanics trades areas.

15.0 DEMONSTRATE TEAM SKILLS--The student will be able to:

15.01 Participate as a responsible "team member" during laboratory activities.
15.02 Work cooperatively with others.
15.03 Perform a role in the shop cleanup and housekeeping schedule.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8700330
Course Title: Practical Construction Trades
Course Credit: 1

COURSE DESCRIPTION:

01.0 DEMONSTRATE REALISTIC KNOWLEDGE OF OCCUPATIONS, SKILLS, AND WORK ENVIRONMENT--The student will be able to:

- 01.01 Identify four construction trades occupations.
- 01.02 Relate the types of duties required of employees in each of two construction trades areas.
- 01.03 Describe the working conditions of workers in each of three construction trades areas.

02.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--The student will be able to:

- 02.01 Demonstrate acceptable employee health habits.
- 02.02 Identify or demonstrate acceptable personal grooming habits.

03.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

- 03.01 Identify physical safety rules.
- 03.02 Identify physical safety hazards.
- 03.03 Recognize and correct or report physical safety hazards.
- 03.04 Identify electrical safety rules.
- 03.05 Identify electrical safety hazards.
- 03.06 Recognize and correct or report electrical safety hazards.
- 03.07 Identify fire safety rules.
- 03.08 Identify fire safety hazards.
- 03.09 Recognize and correct or report fire safety hazards.
- 03.10 Identify first aid requirements.

04.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

- 04.01 Follow safety rules and procedures.
- 04.02 Identify and properly use hand tools common to the construction trades.
- 04.03 Follow safety rules established for power equipment.
- 04.04 Safely use common construction trades power tools.

05.0 PRODUCE AND INTERPRET PERTINENT TECHNICAL DOCUMENTATION--The student will be able to:

- 05.01 Interpret blueprints of various construction trades.
- 05.02 Draw freehand sketches of specific construction trade jobs.
- 05.03 Make a floor plan for a residence showing plumbing and electrical symbols.

06.0 USE UNITS AND MEASUREMENTS RELATING TO SUBJECT OCCUPATIONS--The student will be able to:

06.01 Identify common construction trades measurement and layout tools.
06.02 Use measuring tools to layout a given construction trade job to specific dimensions.
06.03 Use precision construction trades measurement tools.

07.0 CONSTRUCT PROJECTS OR COMPLETE TASKS--The student will be able to:

07.01 Prepare a sketched plan and construct a carpentry project.
07.02 Prepare a sketched plan and construct a brick or block laying project.
07.03 Complete an assigned task in another construction trade area.

08.0 IDENTIFY PERTINENT MATERIALS AND PROCESSES--The student will be able to:

08.01 Identify by name various types of building materials.
08.02 Identify by name various shapes of concrete block.
08.03 Identify various roofing materials.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.03 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.04 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.

11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Locate and select employment opportunities.
12.02 Understand employment capabilities.
12.03 Demonstrate employment seeking skills.
12.04 Demonstrate appropriate work behavior.
12.05 Project a professional image.
12.06 Work individually and cooperatively as a member of regular or culturally diverse team.
12.07 Balance personal and professional life.
12.08 Use and conserve resources and energy.
12.09 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes, Chapter 442.
12.10 Adapt to change.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 Identify the necessary personal characteristics of a successful entrepreneur.

14.0 USE EMPLOYABILITY SKILLS TO RESEARCH JOB AND TRAINING OPPORTUNITIES--The student will be able to:

14.01 List 3 ways to find a job in the construction trades.
14.02 List 3 different local construction trades job openings, the qualifications for each and the salary for each.
14.03 List the local training opportunities available in 3 or more construction trades.

15.0 DEMONSTRATE TEAM SKILLS--The student will be able to:

15.01 Participate as a responsible "team member" during laboratory activities.
15.02 Work cooperatively with others.
15.03 Perform a role in the shop cleanup and housekeeping schedule.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8700340
Course Title: Practical Electrical/Electronics
Course Credit: 1

COURSE DESCRIPTION:

01.0 DEMONSTRATE REALISTIC KNOWLEDGE OF OCCUPATIONS, SKILLS, AND WORK ENVIRONMENT--The student will be able to:

- 01.01 Identify four electrical/electronics occupations.
- 01.02 Relate the types of duties required of workers in each of three electrical/electronics trades areas.
- 01.03 Describe the working conditions of workers in each of three electrical/electronics trades area.

02.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--The student will be able to:

- 02.01 Demonstrate acceptable employee health habits.
- 02.02 Identify or demonstrate acceptable personal grooming habits.

03.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

- 03.01 Identify physical safety rules.
- 03.02 Identify physical safety hazards.
- 03.03 Recognize and correct or report physical safety hazards.
- 03.04 Identify electrical safety rules.
- 03.05 Identify electrical safety hazards.
- 03.06 Recognize and correct or report electrical safety hazards.
- 03.07 Identify fire safety rules.
- 03.08 Identify fire safety hazards.
- 03.09 Recognize and correct or report fire safety hazards.
- 03.10 Identify first aid requirements.

04.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

- 04.01 Follow safety rules and procedures.
- 04.02 Identify and properly use hand tools common to the electrical/electronics trades.
- 04.03 Follow safety rules established for power equipment.
- 04.04 Safely use common electrical/electronics trades.

05.0 PRODUCE AND INTERPRET PERTINENT TECHNICAL DOCUMENTATION--The student will be able to:

- 05.01 Interpret schematic symbols and diagrams.
- 05.02 Interpret block diagrams.
- 05.03 Interpret flow charts.
- 05.04 Draw a simple schematic diagram.

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06.0 USE UNITS AND MEASUREMENTS RELATING TO SUBJECT OCCUPATIONS--The student will be able to:

06.01 Identify common electrical/electronics trades measurement tools.
06.02 Use precision electrical/electronics meters to measure specific quantities.

07.0 CONSTRUCT PROJECTS OR COMPLETE TASKS--The student will be able to:

07.01 Prepare a schematic and wire an electronics project.
07.02 Prepare a circuit diagram and wire a residential circuit.
07.03 Prepare a block diagram and wire a logic circuit on a trainer.

08.0 IDENTIFY PERTINENT MATERIALS AND PROCESSES--The student will be able to:

08.01 Identify by name various types electronics components.
08.02 Identify by name given electrical hardware.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.

11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Locate and select employment opportunities.
12.02 Understand employment capabilities.
12.03 Demonstrate employment seeking skills.
12.04 Demonstrate appropriate work behavior.
12.05 Project a professional image.
12.06 Work individually and cooperatively as a member of regular or culturally diverse team.
12.07 Balance personal and professional life.
12.08 Use and conserve resources and energy.
12.09 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes, Chapter 442.
12.10 Adapt to change.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 Identify the necessary personal characteristics of a successful entrepreneur.

14.0 USE EMPLOYABILITY SKILLS TO RESEARCH JOB AND TRAINING OPPORTUNITIES--The student will be able to:

14.01 List 3 ways to find a job in the electrical/electronics trades.
14.02 List 3 different local electrical/electronics trades job openings, the qualifications for each and the salary for each.
14.03 List the local training opportunities available in 3 electrical/electronics trades area.

15.0 DEMONSTRATE TEAM SKILLS--The student will be able to:

15.01 Participate as a responsible "team member" during laboratory activities.
15.02 Work cooperatively with others.
15.03 Perform a role in the shop cleanup and housekeeping schedule.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8700350
Course Title: Practical Metal Work
Course Credit: 1

COURSE DESCRIPTION:

01.0 DEMONSTRATE REALISTIC KNOWLEDGE OF OCCUPATIONS, SKILLS, AND WORK ENVIRONMENT--The student will be able to:

- 01.01 Identify four metals trades occupations.
- 01.02 Relate the types of duties required of employees in each of two metals trades areas.
- 01.03 Describe the working conditions of employees in each of two metals trades areas.

02.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--The student will be able to:

- 02.01 Demonstrate acceptable employee health habits.
- 02.02 Identify or demonstrate acceptable personal grooming habits.

03.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

- 03.01 Identify physical safety rules.
- 03.02 Identify physical safety hazards.
- 03.03 Recognize and correct or report physical safety hazards.
- 03.04 Identify electrical safety rules.
- 03.05 Identify electrical safety hazards.
- 03.06 Recognize and correct or report electrical safety hazards.
- 03.07 Identify fire safety rules.
- 03.08 Identify fire safety hazards.
- 03.09 Recognize and correct or report fire safety hazards.
- 03.10 Identify first aid requirements.

04.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

- 04.01 Follow safety rules and procedures.
- 04.02 Identify and properly use hand tools common to the sheetmetals, machine shop and welding trades.
- 04.03 Follow safety rules established for power equipment.
- 04.04 Safely use common machine shop, welding and sheetmetal trades power tools and equipment.

05.0 PRODUCE AND INTERPRET PERTINENT TECHNICAL DOCUMENTATION--The student will be able to:

- 05.01 Interpret various metals trades plans.
- 05.02 Draw freehand sketches of specific metals trades projects with dimensions.

06.0 USE UNITS AND MEASUREMENTS RELATING TO SUBJECT OCCUPATIONS--The student will be able to:

06.01 Identify common metals trades measurement and layout tools.
06.02 Use measuring tools to layout a given metals trade job to specific dimensions.
06.03 Use precision metals trades measurement tools.

07.0 CONSTRUCT PROJECTS OR COMPLETE TASKS--The student will be able to:

07.01 Prepare a sketched working drawing, select materials and construct a useful sheetmetal project.
07.02 Prepare a sketched working drawing, select materials and construct a useful machine shop project.
07.03 Prepare a sketched working drawing, select materials and construct a useful welding project.

08.0 IDENTIFY PERTINENT MATERIALS AND PROCESSES--The student will be able to:

08.01 Identify by name given sheetmetal samples.
08.02 Identify by name given sheet structural shapes.
08.03 Identify the uses of common metals used in machine shop work.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Locate and select employment opportunities.
12.02 Understand employment capabilities.
12.03 Demonstrate employment seeking skills.
12.04 Demonstrate appropriate work behavior.
12.05 Project a professional image.
12.06 Work individually and cooperatively as a member of regular or culturally diverse team.
12.07 Balance personal and professional life.
12.08 Use and conserve resources and energy.
12.09 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes, Chapter 442.
12.10 Adapt to change.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 Identify the necessary personal characteristics of a successful entrepreneur.

14.0 USE EMPLOYABILITY SKILLS TO RESEARCH JOB AND TRAINING OPPORTUNITIES--The student will be able to:

14.01 List 3 ways to find a job in the metals trades.
14.02 List 3 different local metals trades job openings, the qualifications for each and the salary for each.
14.03 List the local training opportunities available in 3 or more metals trades areas.

15.0 DEMONSTRATE TEAM SKILLS--The student will be able to:

15.01 Participate as a responsible "team member" during laboratory activities.
15.02 Work cooperatively with others.
15.03 Perform a role in the shop cleanup and housekeeping schedule.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8700360
Course Title: Practical Commercial Foods
Course Credit: 1

COURSE DESCRIPTION:

01.0 DEMONSTRATE REALISTIC KNOWLEDGE OF OCCUPATIONS, SKILLS, AND WORK ENVIRONMENT--The student will be able to:

- 01.01 Identify four food service occupations.
- 01.02 Relate the duties and responsibilities of workers in each of four identified occupations.
- 01.03 Describe the working conditions of persons employed in each of four identified occupations.

02.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--The student will be able to:

- 02.01 Chemical/Cleaning Agents
  - 02.01.01 Identify chemicals/cleaning agents and describe and practice proper usage.
  - 02.01.02 Identify and practice proper storage procedures for chemicals/cleaning agents.
  - 02.01.03 Identify and practice personnel handling precautions for caustics and acids.
  - 02.01.04 Identify dangers of food contamination by chemicals/cleaning agents and identify and practice precautions against food contamination by chemicals/cleaning agents.
- 02.02 Food Borne Illness
  - 02.02.01 Identify food borne illness and possible/probable causes.
  - 02.02.02 Identify and practice preventative measures to preclude the occurrence of food borne illness.
- 02.03 Personal Sanitation
  - 02.03.01 Recognize and practice personal hygiene standards consistent with aesthetic and sanitation requirements of food service operations.
- 02.04 Receiving/Dry Stores Area
  - 02.04.01 Recognize and maintain a clean and sanitary receiving/dry stores area.
  - 02.04.02 Clean and sanitize floors and walls.
  - 02.04.03 Recognize and report indications of food spoilage.
  - 02.04.04 Recognize and report indications of insect or rodent infestation.
- 02.05 Food Preparation Areas
  - 02.05.01 Recognize and maintain clean and sanitary food preparation surfaces.
  - 02.05.02 Clean and sanitize floors and walls.

02.05.03 Recognize and report indications of insect or rodent infestation.

03.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

03.01 Safety Hazards
- 03.01.01 Identify physical safety rules.
- 03.01.02 Identify physical safety hazards.
- 03.01.03 Recognize and correct or report physical safety hazards.
- 03.01.04 Identify electrical safety rules.
- 03.01.05 Identify electrical safety hazards.
- 03.01.06 Recognize and correct or report electrical safety hazards.
- 03.01.07 Identify fire safety rules.
- 03.01.08 Identify fire safety hazards.
- 03.01.09 Recognize and correct or report fire safety hazards.

03.02 First Aid
- 03.02.01 Identify first aid requirements for a commercial food service operation.
- 03.02.02 Prepare subject and perform Heimlich maneuver.

04.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

04.01 Hand Tools
- 04.01.01 Identify special precautions to be used when working with hand tools.
- 04.01.02 Select and use hand tools in a safe and efficient manner.

04.02 Knives and Cutting Tools
- 04.02.01 Identify special precautions to be used when working with knives and cutting tools.
- 04.02.02 Sharpen correctly knives and cutting tools. Inspect handles and guards and report any discrepancy.
- 04.02.03 Use knives and cutting tools in a safe and efficient manner.

04.03 Mixers and Blenders
- 04.03.01 Identify special precautions to be used when working with mixers and blenders.
- 04.03.02 Correctly assemble and disassemble equipment.
- 04.03.03 Operate mixers and blenders in a safe and efficient manner.
- 04.03.04 Perform the above competencies for all accessories or attachments used with the equipment.

04.04 Ovens, Ranges, Griddles, Fryers, Broilers, and Toasters
- 04.04.01 Identify special precautions to be used when working with ovens, ranges, griddles, fryers, broilers and toasters.
- 04.04.02 Correctly assemble and disassemble equipment. Inspect all parts and report any discrepancy.
- 04.04.03 Operate ovens, ranges, griddles, fryers, broilers and toasters in a safe and efficient manner.

05.0 PRODUCE AND INTERPRET PERTINENT TECHNICAL DOCUMENTATION--The student will be able to:

05.01 Select appropriate recipe or recipes for a given food product.
05.02 Identify ingredients and required quantities for a given recipe.
05.03 Convert recipes for both greater and lesser number of portions.
05.04 Draw a simple schematic diagram.

06.0 USE UNITS AND MEASUREMENTS RELATING TO SUBJECT OCCUPATIONS--The student will be able to:

06.01 Identify standard volume, liquid and weight, as they apply to commercial food operations.
06.02 Convert accurately between standard units of measure as applicable to commercial food operations.

07.0 CONSTRUCT PROJECTS OR COMPLETE TASKS--The student will be able to:

07.01 Identify and select materials for a given recipe.
07.02 Prepare given recipe.
07.03 Hold product for service.
07.04 Garnish and present product as appropriate.
07.05 Store reusable portions.

08.0 IDENTIFY PERTINENT MATERIALS AND PROCESSES--The student will be able to:

08.01 Identify chemical/cleaning agents and their respective use and precautions.
08.02 Identify consumable non-food items and their respective used.
08.03 Identify food groups and associated hazards and precautions.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.03 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

10.04 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Locate and select employment opportunities.
12.02 Understand employment capabilities.
12.03 Demonstrate employment seeking skills.
12.04 Demonstrate appropriate work behavior.
12.05 Project a professional image.
12.06 Work individually and cooperatively as a member of regular or culturally diverse team.
12.07 Balance personal and professional life.
12.08 Use and conserve resources and energy.
12.09 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes, Chapter 442.
12.10 Adapt to change.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 Identify the necessary personal characteristics of a successful entrepreneur.

14.0 USE EMPLOYABILITY SKILLS TO RESEARCH JOB AND TRAINING OPPORTUNITIES--The student will be able to:

14.01 List 3 ways to find a job in the food service industry.
14.02 List 3 different local food service industry job openings, the qualifications for each and the salary for each.
14.03 List the local training opportunities available in 3 or more food service industries.

15.0 DEMONSTRATE TEAM SKILLS--The student will be able to:

15.01 Participate as a responsible "team member" during laboratory activities.
15.02 Work cooperatively with others.
15.03 Perform a role in the shop cleanup and housekeeping schedule.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8700370
Course Title: Practical Graphic Arts
Course Credit: 1

COURSE DESCRIPTION:

01.0 DEMONSTRATE REALISTIC KNOWLEDGE OF OCCUPATIONS, SKILLS, AND WORK ENVIRONMENT--The student will be able to:

- 01.01 Identify four graphic trades occupations.
- 01.02 Relate the types of duties required of workers in each of four graphic trades areas.
- 01.03 Describe the working conditions of workers in each of four graphic trades areas.

02.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--The student will be able to:

- 02.01 Demonstrate acceptable employee health habits.
- 02.02 Identify or demonstrate acceptable personal grooming habits.

03.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

- 03.01 Identify physical safety rules.
- 03.02 Identify physical safety hazards.
- 03.03 Recognize and correct or report physical safety hazards.
- 03.04 Identify electrical safety rules.
- 03.05 Identify electrical safety hazards.
- 03.06 Recognize and correct or report electrical safety hazards.
- 03.07 Identify fire safety rules.
- 03.08 Identify fire safety hazards.
- 03.09 Recognize and correct or report fire safety hazards.
- 03.10 Identify first aid requirements.

04.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

- 04.01 Follow safety rules and procedures.
- 04.02 Identify and properly use hand tools common to graphics trades.
- 04.03 Follow safety rules established for power equipment.
- 04.04 Safely use power equipment common to the graphics trades.

05.0 PRODUCE AND INTERPRET PERTINENT TECHNICAL DOCUMENTATION--The student will be able to:

- 05.01 Prepare thumbnail layout.
- 05.02 Prepare rough layout.
- 05.03 Prepare comprehensive layout including finished working dummy.
- 05.04 Paste up mechanical elements.
- 05.05 Operate desk-top publishing equipment.

06.0 USE UNITS AND MEASUREMENTS RELATING TO SUBJECT OCCUPATIONS--The student will be able to:

06.01 Use printer's measurements to compute inches and fractions, points and picas, and decimals, percentages and proportions.
06.02 Identify characteristics of printing papers to specify basic weights, sizes and grades.

07.0 CONSTRUCT PROJECTS OR COMPLETE TASKS--The student will be able to:

07.01 Complete an assigned task in pre-press operations.
07.02 Complete an assigned task in offset press operations.
07.03 Complete an assigned task in finishing bindery operations.

08.0 IDENTIFY PERTINENT MATERIALS AND PROCESSES--The student will be able to:

08.01 Identify by name given graphic trades materials.
08.02 Identify the uses of given graphic trades materials.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.03 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.04 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Locate and select employment opportunities.
12.02 Understand employment capabilities.
12.03 Demonstrate employment seeking skills.
12.04 Demonstrate appropriate work behavior.
12.05 Project a professional image.
12.06 Work individually and cooperatively as a member of regular or culturally diverse team.
12.07 Balance personal and professional life.
12.08 Use and conserve resources and energy.
12.09 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes, Chapter 442.
12.10 Adapt to change.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 Identify the necessary personal characteristics of a successful entrepreneur.

14.0 USE EMPLOYABILITY SKILLS TO RESEARCH JOB AND TRAINING OPPORTUNITIES--The student will be able to:

14.01 List 3 ways to find a job in the graphic trades.
14.02 List 3 different local graphic trades job openings, the qualifications for each and the salary for each.
14.03 List the local training opportunities available in 3 or more graphic trades.

15.0 DEMONSTRATE TEAM SKILLS--The student will be able to:

15.01 Participate as a responsible "team member" during laboratory activities.
15.02 Work cooperatively with others.
15.03 Perform a role in the shop cleanup and housekeeping schedule.

Program: 8700300 Practical, Technical and Industrial Occupations

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8700380
Course Title: Practical Drafting
Course Credit: 1

COURSE DESCRIPTION:

01.0 DEMONSTRATE REALISTIC KNOWLEDGE OF OCCUPATIONS, SKILLS, AND WORK ENVIRONMENT--The student will be able to:

- 01.01 Identify occupations utilizing drafting and/or drafting skills as a part of the job description.
- 01.02 Relate the types of drafting duties required of employees in each of two of the identified occupations.

02.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--The student will be able to:

- 02.01 Demonstrate acceptable employee health habits.
- 02.02 Identify or demonstrate acceptable personal grooming habits.

03.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

- 03.01 Follow drafting room rules and procedures.

04.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

- 04.01 Differentiate the Alphabet of Lines.
- 04.02 Use various freehand and other lettering techniques.
- 04.03 Produce freehand sketches.
- 04.04 Use and maintain the drafting station including T-square, parallel rule and drafting or track machine.
- 04.05 Select proper pencils and pens.
- 04.06 Use and maintain triangles, protractors, french curves, templates and drafting instruments.
- 04.07 Make reproductive copies.
- 04.08 Plot a drawing generated by CAD.

05.0 PRODUCE AND INTERPRET PERTINENT TECHNICAL DOCUMENTATION--The student will be able to:

- 05.01 Identify three types of plans and schematics and explain the use of each.
- 05.02 Read and interpret three plans and/or schematics.
- 05.03 Define working drawings.
- 05.04 Prepare working drawings utilizing auxiliaries and/or sections.
- 05.05 Make corrections to drawings.

06.0 USE UNITS AND MEASUREMENTS RELATING TO SUBJECT OCCUPATIONS--The student will be able to:

06.01 Use engineers, architects and metric scales.

07.0 CONSTRUCT PROJECTS OR COMPLETE TASKS--The student will be able to:

07.01 Prepare orthographic drawings.
07.02 Prepare section drawings.
07.03 Prepare auxiliary drawings.
07.04 Prepare drawings with dimensions.
07.05 Organize and complete assigned drafting problems.
07.06 Explain methods of pictorial drawing.
07.07 Prepare isometric drawings.
07.08 Prepare oblique drawings.
07.09 Prepare perspective drawings.
07.10 Explain methods of surface developments.
07.11 Prepare drawings with stretchouts of prisms, cones, cylinders and pyramids.
07.12 Prepare drawings involving intersecting pieces.
07.13 Apply basic knowledge and skills of drafting on CAD systems by completing assigned drawings in either engineering, architectural or technical illustration classification.

08.0 IDENTIFY PERTINENT MATERIALS AND PROCESSES--The student will be able to:

08.01 Identify by name tools and materials used in drafting.
08.02 Identify the uses of given tools and materials.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Interpret reports and specifications.
09.02 Research and prepare technical reports.
09.03 Prepare visual aids and handouts and give technical report.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve arithmetic problems.
10.02 Solve algebra problems.
10.03 Solve geometry problems.
10.04 Solve trigonometry problems.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Locate and select employment opportunities.
12.02 Understand employment capabilities.
12.03 Demonstrate employment seeking skills.
12.04 Demonstrate appropriate work behavior.
12.05 Project a professional image.
12.06 Work individually and cooperatively as a member of regular or culturally diverse team.
12.07 Balance personal and professional life.
12.08 Use and conserve resources and energy.
12.09 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes, Chapter 442.
12.10 Adapt to change.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 Identify the necessary personal characteristics of a successful entrepreneur.

14.0 USE EMPLOYABILITY SKILLS TO RESEARCH JOB AND TRAINING OPPORTUNITIES--The student will be able to:

14.01 List 3 ways to find a job in the drafting field.
14.02 List 3 different local drafting job openings, the qualifications for each and the salary for each.
14.03 List the local training opportunities available in 3 or more drafting occupations.

15.0 DEMONSTRATE TEAM SKILLS--The student will be able to:

15.01 Participate as a responsible "team member" during laboratory activities.
15.02 Work cooperatively with others.

Program: 8700300 Practical, Technical and Industrial Occupations

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8700390
Course Title: Practical Aviation Careers
Course Credit: 1

COURSE DESCRIPTION:

01.0 DEMONSTRATE REALISTIC KNOWLEDGE OF OCCUPATIONS, SKILLS, AND WORK ENVIRONMENT--The student will be able to:

- 01.01 Identify four aviation trades occupations.
- 01.02 Relate the types of duties required of workers in each of four aviation trades areas.
- 01.03 Describe the working conditions of workers in each of four aviation trades areas.

02.0 DEMONSTRATE ACCEPTABLE PROFESSIONAL AND PERSONAL SANITATION PRACTICES--The student will be able to:

- 02.01 Demonstrate acceptable employee health habits.
- 02.02 Identify or demonstrate acceptable personal grooming habits.

03.0 DEMONSTRATE SAFE WORKING PRACTICES--The student will be able to:

- 03.01 Identify physical safety rules.
- 03.02 Identify physical safety hazards.
- 03.03 Recognize and correct or report physical safety hazards.
- 03.04 Identify electrical safety rules.
- 03.05 Identify electrical safety hazards.
- 03.06 Recognize and correct or report electrical safety hazards.
- 03.07 Identify fire safety rules.
- 03.08 Identify fire safety hazards.
- 03.09 Recognize and correct or report fire safety hazards.
- 03.10 Identify first aid requirements.

04.0 DEMONSTRATE EQUIPMENT OPERATION SKILLS--The student will be able to:

- 04.01 Follow safety rules and procedures.
- 04.02 Identify and properly use hand tools common to the aviation trades.
- 04.03 Follow safety rules established for power equipment.
- 04.04 Safely use common aviation trades power tools and equipment.

05.0 PRODUCE AND INTERPRET PERTINENT TECHNICAL DOCUMENTATION--The student will be able to:

- 05.01 Interpret drawings, symbols and schematic diagrams.
- 05.02 Interpret aviation manuals.

06.0 USE UNITS AND MEASUREMENTS RELATING TO SUBJECT OCCUPATIONS--The student will be able to:

06.01 Identify common aviation measurements.
06.02 Use measuring tools to perform specified power plant tasks.

06.03 Use measuring tools to perform specified air frame tasks.
06.04 Use measuring tools to perform electrical tasks.

07.0 CONSTRUCT PROJECTS OR COMPLETE TASKS--The student will be able to:

07.01 Complete an assigned power plant task.
07.02 Complete an assigned air frame task.
07.03 Complete an assigned electrical task.

08.0 IDENTIFY PERTINENT MATERIALS AND PROCESSES--The student will be able to:

08.01 Identify power plant components and system relationship.
08.02 Identify air frame components and system relationship.
08.03 Identify electrical components and system relationship.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.03 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.04 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.

11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Locate and select employment opportunities.
12.02 Understand employment capabilities.
12.03 Demonstrate employment seeking skills.
12.04 Demonstrate appropriate work behavior.
12.05 Project a professional image.
12.06 Work individually and cooperatively as a member of regular or culturally diverse team.
12.07 Balance personal and professional life.
12.08 Use and conserve resources and energy.
12.09 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes, Chapter 442.
12.10 Adapt to change.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 Identify the necessary personal characteristics of a successful entrepreneur.

14.0 USE EMPLOYABILITY SKILLS TO RESEARCH JOB AND TRAINING OPPORTUNITIES--The student will be able to:

14.01 List 3 ways to find a job in the aviation trades.
14.02 List 3 different local aviation trades job openings, the qualifications for each and the salary for each.
14.03 List the local training opportunities available in 3 or more aviation trades.

15.0 DEMONSTRATE TEAM SKILLS--The student will be able to:

15.01 Participate as a responsible "team member" during laboratory activities.
15.02 Work cooperatively with others.
15.03 Perform a role in the shop cleanup and housekeeping schedule.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Precision Metal Fabrication
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I480504**
CIP Number	0648.050400
Grade Level	30, 31
Length	1600 hours
Certification	SHEETMETAL @7 G
	METAL WORK @7 G
	WELDING @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as structural metal fabricators (91714801), metal fabricators-assemblers (809.381-010). This program also provides supplemental training for persons previously or currently employed in these occupations.

The course content will include the following; measurement and layout, planning and design, sheetmetal work, structural steel, welding, mechanical fasteners, metal properties, heat treating and metalworking tools. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Metal industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: measuring and layout tools, bench metal operations, electric metal bonding operations, gas welding and cutting operations, sheetmetal operations, grinding and sharpening tools and metalworking machines.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and

employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 8.0, Language 8.0, Reading 8.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1600 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate basic metal fabrication skills.
02.0 Demonstrate ability to read plans and drawings.
03.0 Perform measuring and layout operations.
04.0 Describe metals and their properties.
05.0 Operate metalworking machines.
06.0 Perform metal fabrication operations.
07.0 Perform gas welding and cutting operations.
08.0 Perform electric metal-bonding operations.
09.0 Perform assembly operation.
10.0 Demonstrate ability to apply geometric form and position control.
11.0 Organize and plan work.
12.0 Demonstrate appropriate communication skills.
13.0 Demonstrate appropriate math skills.
14.0 Demonstrate appropriate understanding of basic science.
15.0 Demonstrate and practice employability skills.
16.0 Demonstrate an understanding of entrepreneurship.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Precision Metal Fabrication
Secondary Number:
Postsecondary Number: I480504

01.0 DEMONSTRATE BASIC METAL FABRICATION SKILLS--The student will be able to:

- 01.01 Comply with safety and operating rules and practices.
- 01.02 Maintain a clean and orderly shop.
- 01.03 Make job-related decimal and fraction calculations.
- 01.04 Solve job-related problems by adding, subtracting, multiplying and dividing numbers.
- 01.05 Solve job-related problems operating a hand-held calculator.
- 01.06 Solve job-related problems using mathematical handbooks, charts and tables.
- 01.07 Compute feet, inches and yards.
- 01.08 Use the protractor to measure angles to nearest degree.
- 01.09 Use the protractor and triangles to draw angles.
- 01.10 Demonstrate proper use of material handling techniques.
- 01.11 Solve job-related problems using basic formulas.
- 01.12 Solve job-related problems using basic geometry.
- 01.13 Solve job-related problems using basic trigonometry.
- 01.14 Calculate the amount of material that is required to fabricate project.
- 01.15 Calculate machine feed and speed by using formulas.
- 01.16 Calculate set back and bend allowance.

02.0 DEMONSTRATE ABILITY TO READ PLANS AND DRAWINGS--The student will be able o:

- 02.01 Identify dimensions.
- 02.02 Identify lists of materials and specifications.
- 02.03 Identify section views/detail views.
- 02.04 Disassemble and assemble parts using an exploded view drawing.
- 02.05 Interpret blueprint abbreviations.
- 02.06 Identify dimensioning of radii, round holes, fillets and chamfers.
- 02.07 Identify screw threads and bolt types.
- 02.08 Apply dimensional tolerances.
- 02.09 Identify metal fabrication symbols used in blueprints.
- 02.10 Read and interpret title block information.
- 02.11 Identify and interpret rivet call outs.
- 02.12 Identify and interpret weld call outs.
- 02.13 Identify and interpret general and local notes.
- 02.14 Describe the use of assembly blueprints and detail blueprints.

03.0 PERFORM MEASURING AND LAYOUT OPERATIONS--The student will be able to:

- 03.01 Perform basic geometric construction.

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03.02 Use marking gages, center punches, scribes, surface gages, squares, dividers, dial indicators, protractors, surfaceplates, depth gates and circumference rules.
03.03 Develop patterns using parallel line, radial line and triangulation.
03.04 Make metal fabrication sketches.
03.05 Read and measure with steel rules.
03.06 Read and measure with micrometers.
03.07 Read and measure with vernier height gages.
03.08 Read and measure with dial calipers.
03.09 Read and measure with universal bevel protractor.
03.10 Measure with sine bars.
03.11 Read and measure with dial indicators.
03.12 Apply parallel bars, angle plates and surface gages to precision measurement operations.
03.13 Apply "V" blocks to precision measurement operations.
03.14 Use gage blocks in establishing measurement.
03.15 Layout work piece using marking gages, center punches, scribes, surface gages, squares, dividers, dial indicators, protractors, surface plates, depth gages and circumference rules.
03.16 Perform flat pattern bracket layouts.
03.17 Perform cone development, construct radial line and use triangulation.

04.0 DESCRIBE METALS AND THEIR PROPERTIES--The student will be able to:

04.01 Describe the steelmaking process.
04.02 Describe the differences between ferrous and nonferrous metals.
04.03 Describe casting, alloys and forging.
04.04 Identify metals such as galvanized iron and steel, aluminum stainless steel, sheetmetal, copper and brass.
04.05 Identify properties of the most common metals.
04.06 Identify and describe common gages, shapes and dimensions of purchased materials.

05.0 OPERATE METALWORKING MACHINES--The student will be able to:

05.01 Identify the purpose of various types of machine shop equipment.
05.02 Identify types of a drill press.
05.03 Operate a drill press utilizing the correct drilling speed.
05.04 Operate a band saw utilizing the correct cutting speed.
05.05 Demonstrate clamping devices for securing stock for drilling.
05.06 Identify types and sizes of drill bits.
05.07 Use portable power saw equipment.
05.08 Use a cutoff or power hacksaw.
05.09 Use electric and air utility grinders.
05.10 Sharpen drill bits.
05.11 Select proper type of abrasive wheels for grinding machines.
05.12 Operate large belt sander.
05.13 Operate power press brake.
05.14 Operate power metal shear.
05.15 Operate various manual brakes.
05.16 Operate power jitterbug shear.

05.17 Operate bench grinders.
05.18 Operate beverly shear.
05.19 Operate unishear.

06.0 PERFORM METAL FABRICATION OPERATIONS--The student will be able to:

06.01 Fabricate metal, edges and seams.
06.02 Use hand tools to cut, punch and shear metal.
06.03 Form sheetmetal using a brake, a folder, rolls and a turning machine.
06.04 Join metals using solder, rivets and mechanical fasteners.
06.05 Make fixtures as required (Micarta and Mild Steel).
06.06 Arrange proper setup in vise using safety devices.
06.07 Demonstrate ability to cut various shapes of metal stock.
06.08 Demonstrate ability to bend various shapes of metal stock.
06.09 Inspect fabricated parts.

07.0 PERFORM GAS WELDING AND CUTTING OPERATIONS--The student will be able to:

07.01 Identify welding cylinders, regulators, hoses, pressure gages and torches.
07.02 Describe welding equipment safety procedures.
07.03 Demonstrate proper flame settings.
07.04 Demonstrate basic gas welding skills.
07.05 Demonstrate procedures for adjusting and operating the oxyacetylene cutting torch.
07.06 Demonstrate freehand and guide cutting of various metal thicknesses.
07.07 Set up and operate a plasma arc cutting machine.

08.0 PERFORM ELECTRIC METAL-BONDING OPERATIONS--The student will be able to:

08.01 Describe and demonstrate the spot and arc welding process.
08.02 Demonstrate basic procedures for safely adjusting and operating an arc welder, selecting a rod, striking and maintaining an arc, welding in various positions and clamping.
08.03 Setup and operate a spot welder.
08.04 Explain and demonstrate the MIG welding process.
08.05 Apply basic procedures for safely adjusting, operating, cleaning and maintaining MIG welding equipment.
08.06 Apply basic procedures for safely adjusting and operating a TIG welder, welding in various positions, selecting proper tips and choosing filler metal.

09.0 PERFORM ASSEMBLY OPERATION--The student will be able to:

09.01 Identify weld symbols.
09.02 Perform required weld preparation.
09.03 Assist welder in weld operation.
09.04 Identify rivet symbol.
09.05 Install proper diameter holes and prepare metal surfaces for riveting.
09.06 Determine whether rivet is to be "shot" or squeezed.
09.07 Perform proper setup and upset rivets.

09.08 Set up and install blind rivets.

10.0 DEMONSTRATE ABILITY TO APPLY GEOMETRIC FORM AND POSITION CONTROL--The student will be able to:

10.01 Identify material condition and perfect form.
10.02 Identify the eleven form characteristics.
10.03 Identify the two position characteristics.
10.04 Identify the seven different tolerance zones.
10.05 Identify datum symbols.
10.06 Identify datum planes.
10.07 Identify datum axis.
10.08 Identify datum centerplane.
10.09 Identify the three plan datum system and multiple datums.
10.10 Identify material condition modifiers.
10.11 Solve bonus tolerance applications.
10.12 Solve datum zone applications.
10.13 Identify tolerance value indicator.
10.14 Identify American National Standards Institute.
10.15 Identify International Standards Institute.

11.0 ORGANIZE AND PLAN WORK--The student will be able to:

11.01 Interpret blueprints and drawings to acquire proper amount of material.
11.02 Requisition proper tools and equipment to fabricate parts.
11.03 Develop and project plan.

12.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

12.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
12.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
12.03 Read and follow written and oral instructions.
12.04 Answer and ask questions coherently and concisely.
12.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
12.06 Demonstrate appropriate telephone/communication skills.

13.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

13.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
13.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
13.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
13.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
13.05 Demonstrate an understanding of federal, state and local taxes and their computation.

14.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

14.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
14.02 Draw conclusions or make inferences from data.
14.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
14.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

15.0 DEMONSTRATE AND PRACTICE EMPLOYABILITY SKILLS--The student will be able to:

15.01 Conduct a job search.
15.02 Secure information about a job.
15.03 Identify documents that may be required when applying for job.
15.04 Complete a job application form correctly.
15.05 Demonstrate competence in job interview techniques.
15.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
15.07 Identify acceptable work habits.
15.08 Demonstrate knowledge of how to make job changes appropriately.
15.09 Demonstrate acceptable employee health habits.
15.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

16.01 Define entrepreneurship.
16.02 Describe the importance of entrepreneurship to the American economy.
16.03 List the advantages and disadvantages of business ownership.
16.04 Identify the risks involved in ownership of a business.
16.05 Identify the necessary personal characteristics of a successful entrepreneur.
16.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Printing
Occupational Area:	Industrial Education
	Secondary
Program Numbers	**8739000**
CIP Number	0648.020101
Grade Level	9-12, 30, 31
Length	6 credits
Certification	PRINTING @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for initial employment as offset lithographic press setters (92512835), paste-up mechanical assemblers (970.381-018), offset press operators (651.685-018), bindery operators (653.685-010). This program also provides supplemental training for persons previously or currently employed in these occupations.

The course content will include the following: administrative support operations; pre-press operations; press operations; and finishing operations. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

Listed below are the courses that comprise this program when offered at the secondary level:

8739010 - Printing 1
8739020 - Printing 2
8739030 - Printing 3
8739040 - Printing 4
8739050 - Printing 5
8739060 - Printing 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Printing industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: customer layouts, desk-top publishing, composition and camera-ready copy; producing line negatives, halftone negatives, and multicolor and process-color negatives; producing single-color proofs and multicolor color proofs; producing printing plates; operating and adjusting duplicators; and operating cutting, folding and binding equipment.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

When the cooperative education method of instruction is used, the program length for the secondary program may be increased by a maximum of 2.0 credits. Other related courses which the student should be encouraged to take while enrolled in this program and which will enhance the student's opportunities in the printing industry include: Journalism, English Literature, Algebra, Chemistry, Physics, Typing, Art, Computer Science and business-related courses.

The typical length of this program for the average achieving student is 900 contact hours (1080 clock hours). It is suggested that 40 percent be theoretical training and 60 percent be hands-on laboratory experiences.

The outcomes and student performance standards which the handicapped student must master must be specified in each student's Individual Education Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in performing clerical administrative support operations.
02.0 Demonstrate proficiency in performing mechanical/creative support operations.
03.0 Demonstrate proficiency in performing pre-press operations.
04.0 Demonstrate proficiency in performing offset press operations.
05.0 Demonstrate proficiency in performing finishing/binding operations.
06.0 Demonstrate appropriate communication skills.
07.0 Demonstrate appropriate math skills.
08.0 Demonstrate appropriate understanding of basic science.
09.0 Demonstrate employability skills.
10.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Printing
Secondary Number: 8739000
Postsecondary Number:

01.0 DEMONSTRATE PROFICIENCY IN PERFORMING CLERICAL ADMINISTRATIVE SUPPORT OPERATIONS--The student will be able to:

- 01.01 Establish sequence of job operations.
- 01.02 Apply basic safety rules.
- 01.03 Use printer's measurements to compute inches and fractions, points and picas, and decimals, percentages and proportions.
- 01.04 Use job information jacket.
- 01.05 Identify characteristics of printing papers to specify basic weights, sizes and grades.
- 01.06 Perform routine maintenance in accordance with manufacturer specifications and established maintenance schedule.
- 01.07 Comply with established waste and spoilage control measures.
- 01.08 Demonstrate use of material safety data sheets.
- 01.09 Demonstrate proper handling of hazardous waste and chemicals.

02.0 DEMONSTRATE PROFICIENCY IN PERFORMING MECHANICAL/CREATIVE SUPPORT OPERATIONS--The student will be able to:

- 2.01 Identify the equipment, tools, and materials used in design and copy preparation and the safety rules pertaining to each.
- 02.02 Prepare thumbnail layout.
- 02.03 Prepare rough layout.
- 02.04 Prepare comprehensive layout including finished working dummy.
- 02.05 Size and proportion photographs, line drawings and other copy elements.
- 02.06 Copyfit and mark up (specify type sizes and styles).
- 02.07 Prepare computer typesetting equipment for operations.
- 02.08 Operate typesetting equipment.
- 02.09 Prepare typesetting processor.
- 02.10 Process typeset copy.
- 02.11 Proofread typeset output.
- 02.12 Paste up mechanical elements including keyline for photographs and tint blocks and ruling.
- 02.13 Prepare tissue overlay and specify color break, tint percentages and reverses.
- 02.14 Check and compare completed mechanical to comprehensive layout for final proofing.
- 02.15 Prepare desk-top publishing equipment for operations.
- 02.16 Operate desk-top publishing equipment.
- 02.17 Proofread desk-top copy.
- 02.18 Modify existing copy utilizing desk-top publishing equipment.
- 02.19 Prepare multiple-page copy utilizing desk-top publishing equipment.

03.0 DEMONSTRATE PROFICIENCY IN PERFORMING PRE-PRESS OPERATIONS--The student will be able to:

03.01 Identify the equipment and materials used in reproduction photography and the safety rules pertaining to each.
03.02 Apply basic principle of photosensitometry, orthochromatic, and panchromatic (including use of gray scale.)
03.03 Apply basic principles of light pertaining to copy board illumination and exposure calculations for all camera functions.
03.04 Apply basic principles of camera optics pertaining to exposure control and focus and camera extensions pertaining to reductions and enlargements.
03.05 Identify the parts of the process camera and explain their use.
03.06 Apply basic principles of darkroom chemistry.
03.07 Prepare darkroom chemistry.
03.08 Establish basic line exposure and exposure time at 100 percent using standard time and temperature development.
03.09 Apply basic principles of Kodak halftone computer and density guide.
03.10 Establish basic exposures to determine screen range, basic flash, main exposure and bump exposure at 100 percent using standard time and temperature development.
03.11 Produce line negatives to size.
03.12 Inspect and compare line negatives to original mechanical.
03.13 Produce halftones to size.
03.14 Inspect and compare halftones to original copy.
03.15 Make line and halftone diffusion transfer prints.
03.16 Inspect and compare prints to original mechanical.
03.17 Apply basic principles of addition and subtraction color pertaining to the use of filters.
03.18 Use filters to hold/delete colors on line shots at 100 percent using standard time and temperature development.
03.19 Identify the parts of a contact frame and light source and explain their use.
03.20 Produce contacts using orthochromatic and duplicating film, transmission density guide and standard time and temperature development.
03.21 Identify equipment and materials used in the stripping function and the safety rules pertaining to each.
03.22 Apply basic principles of stripping using T-square and triangle.
03.23 Strip 1-color, 1-up layouts.
03.24 Strip 1-color, multiple layouts.
03.25 Strip 1-color, step layouts.
03.26 Strip 1-color, 4-page layouts.
03.27 Strip 1-color, 8-page layouts.
03.28 Strip multiple burn layout (halftone and screen tints.)
03.29 Strip multiple flat color layout.
03.30 Inspect and evaluate flats to original mechanical.
03.31 Identify equipment and materials used in proofing and platemaking to obtain proper exposures using a transmission density guide for processing photo-sensitive additive or subtractive paper or metal plates.

03.32 Produce proofs on diazo or silver paper.
03.33 Process proofs.
03.34 Inspect and evaluate proofs to original mechanical.
03.35 Produce additive or subtractive paper or metal plates.
03.36 Process plates.
03.37 Inspect and evaluate plates to proofs.
03.38 File, handle and retrieve flats and plates.

04.0 DEMONSTRATE PROFICIENCY IN PERFORMING OFFSET PRESS OPERATIONS--The student will be able to:

04.01 Identify the equipment and materials used in offset press operations, their parts and functions, and the rules relating to their operation.
04.02 Apply basic principles of offset lithography pertaining to physical and chemical properties of ink components (pigment, vehicle and dryer.)
04.03 Apply basic principles of offset lithography pertaining to dampening systems (ducted and continuous.)
04.04 Apply basic principles of offset lithography pertaining to fountain solutions' chemical components (acid, alkaline and neutral.)
04.05 Apply basic principles of offset lithography pertaining to pH-control and its effects on the lithographic process.
04.06 Apply basic principles of offset lithography pertaining to interrelationships upon the process of paper coated and uncoated and various grades within.
04.07 Apply basic principles of offset lithography pertaining to the interrelationships of textured or smooth paper, paper, plastic, metal plates, and conventional or compressible blankets.
04.08 Apply basic principles of offset lithography pertaining to ink and its drying properties in relation to fountain solution, plate and paper used (including effects of ink film thickness and drying time and set off, and problems associated with inappropriate use of spray powder).
04.09 Apply basic principles of plate preservation after presswork for long-term storage (use of gum Arabic and asphaltum.)
04.10 Prepare press for operation by reviewing job-ticket specifications and then selecting appropriate press and materials.
04.11 Prepare press for operation based on interrelationships of lithographic process.
04.12 Mix fountain solution from concentrate.
04.13 Mix ink to PMS (Pantone Matching System) specifications.
04.14 Introduce ink and fountain solution to press in proper sequence.
04.15 Set up and adjust feeder specifications (air blast, vacuum, and choke.)
04.16 Set up and adjust register system to single sheet or stream fed, side guide, and head register.
04.17 Set up and adjust delivery (chute or chain.)
04.18 Mount plate (pack if necessary) to press specifications.
04.19 Mount blanket (pack if necessary) and adjust to press specifications.

04.20 Set impression cylinder to paper thickness and press specifications.
04.21 Set and adjust ink and water rollers pressures to press specifications.
04.22 Make-ready press to assure ink and water balance for uniform coverage, volume and replenishment of ink, image position, cylinder pressure and sheet registration.
04.23 Inspect and evaluate final make-ready sheet to job-ticket specifications and obtain proof approval to run.
04.24 Set spray powder.
04.25 Produce required number of press sheets to job-ticket specifications.
04.26 Preserve plate for long-term storage.
04.27 Perform press wash-up.
04.28 Perform routine press maintenance to manufacturer's specifications.

05.0 DEMONSTRATE PROFICIENCY IN PERFORMING FINISHING/BINDING OPERATIONS--The student will be able to:

05.01 Identify the equipment and materials used in finishing/binding operations, their parts and functions, and the safety rules relating to their operation.
05.02 Apply basic principles of finishing/binding operations pertaining to prepress paper cutting, post press paper cutting and post bindery cutting (after folding, stitching, etc.)
05.03 Apply basic principles of finishing/binding operations pertaining to sheet cutting.
05.04 Apply basic principles of finishing/binding operations pertaining to grain, caliper and finish (coated or uncoated) of paper.
05.05 Apply basic principles of finishing/binding operations pertaining to signature configurations.
05.06 Apply basic principles of finishing/binding operations pertaining to knife and buckle folding.
05.07 Apply basic principles of finishing/binding operations pertaining to scoring and perforating.
05.08 Apply basic principles of finishing/binding operations pertaining to collating and gathering.
05.09 Apply basic principles of finishing/binding operations pertaining to binding alternatives (saddle, side, perfect, comb, spiral, case, etc.)
05.10 Apply basic principles of finishing/binding operations pertaining to adhesive binding (padding and fan-apart.)
05.11 Apply basic principles of finishing/binding operations pertaining to package and identification.
05.12 Demonstrate methods of counting sheets, (machine, measurement, weight, and rapid multiple-sheet manual counting by fives, etc).
05.13 Hand jog 8 ½ " x 11" sheets.
05.14 Hand jog 17" x 22" and larger sheets.
05.15 Machine jog sheets.
05.16 Prepare rule-out of press sheet for finishing operations according to job-ticket specifications and approved proof.

05.17 Set up and operate cutter in accordance with rule-out.
05.18 Prepare folding dummy from press sheet in accordance with job-ticket specifications and approved proof.
05.19 Set up and operate folder in accordance with job-ticket specifications and folding dummy.
05.20 Make a single fold.
05.21 Make a multiple parallel fold.
05.22 Make a right angle fold.
05.23 Identify and define slitting, perforating and scoring functions pertaining to folding operations.
05.24 Define collating flat sheets.
05.25 Set up and operate stitcher (side and saddle).
05.26 Set up and operate comb binding machine.
05.27 Perform paper padding functions.
05.28 Define perfect, spiral, and case functions.
05.29 Set up and operate a paper drill for standard looseleaf binder.
05.30 Define die-cutting, embossing, foil stamping and numbering.
05.31 Package and identify completed job according to job-ticket specifications.

06.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

06.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
06.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
06.03 Read and follow written and oral instructions.
06.04 Answer and ask questions coherently and concisely.
06.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
06.06 Demonstrate appropriate telephone/communication skills.

07.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

07.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
07.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
07.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
07.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
07.05 Demonstrate an understanding of federal, state and local taxes and their computation.

08.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

08.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
08.02 Draw conclusions or make inferences from data.

08.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

08.04 Understand pressure measurement in terms of P.S.I., inches of mercury. and K.P.A.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

09.01 Conduct a job search.

09.02 Secure information about a job.

09.03 Identify documents which may be required when applying for a job interview.

09.04 Complete a job application form correctly.

09.05 Demonstrate competence in job interview techniques.

09.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

09.07 Identify acceptable work habits.

09.08 Demonstrate knowledge of how to make job changes appropriately.

09.09 Demonstrate acceptable employee health habits.

09.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

10.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

10.01 Define entrepreneurship.

10.02 Describe the importance of entrepreneurship to the American economy.

10.03 List the advantages and disadvantages of business ownership.

10.04 Identify the risks involved in ownership of a business.

10.05 Identify the necessary personal characteristics of a successful entrepreneur.

10.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8739010
Course Title: Printing 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for performing clerical administrative support operations.

01.0 DEMONSTRATE PROFICIENCY IN PERFORMING CLERICAL ADMINISTRATIVE SUPPORT OPERATIONS--The student will be able to:

- 01.01 Establish sequence of job operations.
- 01.02 Apply basic safety rules.
- 01.03 Use printer's measurements to compute inches and fractions, points and picas, decimals, percentages and proportions.
- 01.04 Use job information jacket.
- 01.05 Identify characteristics of printing papers to specify basic weights, sizes and grades.
- 01.06 Perform routine maintenance in accordance with manufacturer specifications and established maintenance schedule.
- 01.07 Comply with established waste and spoilage control measures.
- 01.08 Demonstrate use of material safety data sheets.
- 01.09 Demonstrate proper handling of hazardous waste and chemicals.

06.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 06.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 06.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 06.03 Read and follow written and oral instructions.
- 06.04 Answer and ask questions coherently and concisely.
- 06.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 06.06 Demonstrate appropriate telephone/communication skills.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8739020
Course Title: Printing 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in performing mechanical/ creative support operations.

02.0 DEMONSTRATE PROFICIENCY IN PERFORMING MECHANICAL/CREATIVE SUPPORT OPERATIONS--The student will be able to:

- 02.01 Identify the equipment, tools, and materials used in design and copy preparation and the safety rules pertaining to each.
- 02.02 Prepare thumbnail layout.
- 02.03 Prepare rough layout.
- 02.04 Prepare comprehensive layout including finished working dummy.
- 02.05 Size and proportion photographs, line drawings and other copy elements.
- 02.06 Copyfit and mark up (specify type sizes and styles).
- 02.07 Prepare computer typesetting equipment for operations.
- 02.08 Operate typesetting equipment.
- 02.09 Prepare typesetting processor.
- 02.10 Process typeset copy.
- 02.11 Proofread typeset output.
- 02.12 Paste up mechanical elements including keyline for photographs, tint blocks and ruling.
- 02.13 Prepare tissue overlay and specify color break, tint percentages and reverses.
- 02.14 Check and compare completed mechanical to comprehensive layout for final proofing.
- 02.15 Prepare desk-top publishing equipment for operations.
- 02.16 Operate desk-top publishing equipment.
- 02.17 Proofread desk-top copy.
- 02.18 Modify existing copy utilizing desk-top publishing equipment.
- 02.19 Prepare multiple-page copy utilizing desk-top publishing equipment.

07.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 07.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 07.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 07.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 07.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

07.05 Demonstrate an understanding of federal, state and local taxes and their computation.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8739030
Course Title: Printing 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for performing pre-press operations.

03.0 DEMONSTRATE PROFICIENCY IN PERFORMING PRE-PRESS OPERATIONS--The student will be able to:

- 03.01 Identify the equipment and materials used in reproduction photography and the safety rules pertaining to each.
- 03.02 Apply basic principle of photosensitometry, orthochromatic, and panchromatic (including use of gray scale.)
- 03.03 Apply basic principles of light pertaining to copy board illumination and exposure calculations for all camera functions.
- 03.04 Apply basic principles of camera optics pertaining to exposure control and focus and camera extensions pertaining to reductions and enlargements.
- 03.05 Identify the parts of the process camera and explain their use.
- 03.06 Apply basic principles of darkroom chemistry.
- 03.07 Prepare darkroom chemistry.
- 03.08 Establish basic line exposure and exposure time at 100 percent using standard time and temperature development.
- 03.09 Apply basic principles of Kodak halftone computer and density guide.
- 03.10 Establish basic exposures to determine screen range, basic flash, main exposure and bump exposure at 100 percent using standard time and temperature development.
- 03.11 Produce line negatives to size.
- 03.12 Inspect and compare line negatives to original mechanical.
- 03.13 Produce halftones to size.
- 03.14 Inspect and compare halftones to original copy.
- 03.15 Make line and halftone diffusion transfer prints.
- 03.16 Inspect and compare prints to original mechanical.
- 03.17 Apply basic principles of addition and subtraction color pertaining to the use of filters.
- 03.18 Use filters to hold/delete colors on line shots at 100 percent using standard time and temperature development.
- 03.19 Identify the parts of a contact frame and light source and explain their use.
- 03.20 Produce contacts using orthochromatic and duplicating film, transmission density guide and standard time and temperature development.
- 03.21 Identify equipment and materials used in the stripping function and the safety rules pertaining to each.

03.22 Apply basic principles of stripping using: T-square and triangle to align, position, and tape film (emulsion side up) on ruled or unruled plastic or paper masking sheets, open windows and opaque on the emulsion side.
03.23 Strip 1-color, 1-up layouts.
03.24 Strip 1-color, multiple layouts.
03.25 Strip 1-color, step layouts.
03.26 Strip 1-color, 4-page layouts.
03.27 Strip 1-color, 8-page layouts.
03.28 Strip multiple burn layout (halftone and screen tints.)
03.29 Strip multiple flat color layout.
03.30 Inspect and compare flats to original mechanical.
03.31 Identify equipment and materials used in proofing and platemaking to obtain proper exposures using a transmission density guide for processing photo-sensitive additive or subtractive paper or metal plates.
03.32 Produce proofs on diazo or silver paper.
03.33 Process proofs.
03.34 Inspect and compare proofs to original mechanical.
03.35 Produce additive or subtractive paper or metal plates.
03.36 Process plates.
03.37 Inspect and compare plates to proofs.
03.38 File, handle and retrieve flats and plates.

08.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

08.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
08.02 Draw conclusions or make inferences from data.
08.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
08.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8739040
Course Title: Printing 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for performing offset press operations.

04.0 DEMONSTRATE PROFICIENCY IN PERFORMING OFFSET PRESS OPERATIONS--The student will be able to:

- 04.01 Identify the equipment and materials used in offset press operations, their parts and functions and the rules relating to their operation.
- 04.02 Apply basic principles of offset lithography pertaining to physical and chemical properties of ink components (pigment, vehicle and dryer.)
- 04.03 Apply basic principles of offset lithography pertaining to dampening systems (ducted and continuous.)
- 04.04 Apply basic principles of offset lithography pertaining to fountain solutions' chemical components (acid, alkaline and neutral.)
- 04.05 Apply basic principles of offset lithography pertaining to pH-control and its effects on the lithographic process.
- 04.06 Apply basic principles of offset lithography pertaining to interrelationships upon the process of paper coated and uncoated and various grades within.
- 04.07 Apply basic principles of offset lithography pertaining to the interrelationships of textured or smooth paper, paper, plastic, metal plates, and conventional or compressible blankets.
- 04.08 Apply basic principles of offset lithography pertaining to ink and its drying properties in relation to fountain solution, plate and paper used (including effects of ink film thickness and drying time and set off, and problems associated with inappropriate use of spray powder.)
- 04.09 Apply basic principles of plate preservation after presswork for long-term storage (use of gum Arabic and asphaltum.)
- 04.10 Prepare press for operation by reviewing job-ticket specifications and then selecting appropriate press and materials.
- 04.11 Prepare press for operation based on interrelationships of lithographic process.
- 04.12 Mix fountain solution from concentrate.
- 04.13 Mix ink to PMS (Pantone Matching System) specifications.
- 04.14 Introduce ink and fountain solution to press in proper sequence.
- 04.15 Set up and adjust feeder specifications (air blast, vacuum and choke.)

04.16 Set up and adjust register system to single sheet or stream fed, side guide and head register.
04.17 Set up and adjust delivery (chute or chain.)
04.18 Mount plate (pack if necessary) to press specifications.
04.19 Mount blanket (pack if necessary) and adjust to press specifications.
04.20 Set impression cylinder to paper thickness and press specifications.
04.21 Set and adjust ink and water rollers pressures to press specifications.
04.22 Make-ready press to assure ink and water balance for uniform coverage, volume and replenishment of ink, image position, cylinder pressure and sheet registration.
04.23 Inspect and evaluate final make-ready sheet to job-ticket specifications and obtain proof approval to run.
04.24 Set spray powder.
04.25 Produce required number of press sheets to job-ticket specifications.
04.26 Preserve plate for long-term storage.
04.27 Perform press wash-up.
04.28 Perform routine press maintenance to manufacturer's specifications.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8739050
Course Title: Printing 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the different procedures for performing finishing/binding.

05.0 DEMONSTRATE PROFICIENCY IN PERFORMING FINISHING/BINDING OPERATIONS--The student will be able to:

- 05.01 Identify the equipment and materials used in finishing/binding operations, their parts and functions and the safety rules relating to their operation.
- 05.02 Apply basic principles of finishing/binding operations pertaining to prepress paper cutting, post press paper cutting and post bindery cutting (after folding, stitching, etc.)
- 05.03 Apply basic principles of finishing/binding operations pertaining to sheet cutting.
- 05.04 Apply basic principles of finishing/binding operations pertaining to grain, caliper and finish (coated or uncoated) of paper.
- 05.05 Apply basic principles of finishing/binding operations pertaining to signature configurations.
- 05.06 Apply basic principles of finishing/binding operations pertaining to knife and buckle folding.
- 05.07 Apply basic principles of finishing/binding operations pertaining to scoring and perforating.
- 05.08 Apply basic principles of finishing/binding operations pertaining to collating and gathering.
- 05.09 Apply basic principles of finishing/binding operations pertaining to binding alternatives (saddle, side, perfect, comb, spiral, case, etc.)
- 05.10 Apply basic principles of finishing/binding operations pertaining to adhesive binding (padding and fan-apart.)
- 05.11 Apply basic principles of finishing/binding operations pertaining to package and identification.
- 05.12 Demonstrate methods of counting sheets, (machine, measurement, weight and rapid multiple-sheet manual counting by fives, etc).
- 05.13 Hand jog 8 ½" x 11" sheets.
- 05.14 Hand jog 17" x 22" and larger sheets.
- 05.15 Machine jog sheets.
- 05.16 Prepare rule-out of press sheet for finishing operations according to job-ticket specifications and approved proof.
- 05.17 Set up and operate cutter in accordance with rule-out.
- 05.18 Prepare folding dummy from press sheet in accordance with job-ticket specifications and approved proof.

05.19 Set up and operate folder in accordance with job-ticket specifications and folding dummy.

05.20 Make a single fold.

05.21 Make a multiple parallel fold.

05.22 Make a right angle fold.

05.23 Identify and define slitting, perforating and scoring functions pertaining to folding operations.

05.24 Define collating flat sheets.

05.26 Set up and operate stitcher (side and saddle).

05.27 Set up and operate comb binding machine.

05.28 Perform paper padding functions.

05.29 Define perfect, spiral and case functions.

05.30 Set up and operate a paper drill for standard looseleaf binder.

05.31 Define die-cutting, embossing, foil stamping and numbering.

05.32 Package and identify completed job according to job-ticket specifications including description and/or sample, quantity per package and number of packages, customer purchase order number and job number.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8739060
Course Title: Printing 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the demonstration of employability skills.

09.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 09.01 Conduct a job search.
- 09.02 Secure information about a job.
- 09.03 Identify documents which may be required when applying for a job interview.
- 09.04 Complete a job application form correctly.
- 09.05 Demonstrate competence in job interview techniques.
- 09.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
- 09.07 Identify acceptable work habits.
- 09.08 Demonstrate knowledge of how to make job changes appropriately.
- 09.09 Demonstrate acceptable employee health habits.
- 09.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

10.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 10.01 Define entrepreneurship.
- 10.02 Describe the importance of entrepreneurship to the American economy.
- 10.03 List the advantages and disadvantages of business ownership.
- 10.04 Identify the risks involved in ownership of a business.
- 10.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 10.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Printing and Graphic Arts
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I480201**
CIP Number	0648.020100
Grade Level	30, 31
Length	1800 hours
Certification	PRINTING @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for initial employment as precision etchers and engravers (89128708), printers (651.380-101). This program also provides supplemental training for persons previously or currently employed in these occupations.

The course content will include the following: administrative support operations, pre-press operations, press operations and finishing operations. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program also prepares individuals to set up, operate and maintain preparation, printing and binding equipment used in the printing industry. Graduates of this program will also be prepared for further specialized training and education in Graphic Arts Technology and other related technologies. This program may also serve as apprenticeship related instruction and qualify individuals for advanced standing in apprenticeship training programs.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Printing and Graphic Arts industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: production of customer layouts, compositions and camera-ready copy; line negatives, halftone negatives and contacts; stripping of line negatives, halftone negatives and multicolor and process-color negatives; production of printing plates, single color proofs and multicolor color proofs; desk-top publishing; operation and adjustment of duplicators; and operation of cutting, folding and binding equipment.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

Other related courses which the student should be encouraged to take while enrolled in this program and which will enhance the student's opportunities in the printing industry include: Journalism, English, Literature Algebra, Chemistry, Physics, Typing, Art, Computer Science, and business related courses.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 8.0, Language 8.0, Reading 8.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1800 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in performing clerical administrative support operations.
02.0 Demonstrate proficiency in performing mechanical creative support operations.
03.0 Demonstrate proficiency in performing pre-press operations.
04.0 Demonstrate proficiency in performing offset press operations.

05.0 Demonstrate proficiency in performing finishing/binding operations.
06.0 Demonstrate the ability to perform support operations for laboratory projects.
07.0 Demonstrate the ability to perform pre-press operations for laboratory projects.
08.0 Demonstrate the ability to perform offset press operations for laboratory projects.
09.0 Demonstrate the ability to perform finishing/binding operations for laboratory projects.
10.0 Demonstrate appropriate communication skills.
11.0 Demonstrate appropriate math skills.
12.0 Demonstrate appropriate understanding of basic science.
13.0 Demonstrate employability skills.
14.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Printing and Graphic Arts
Secondary Number:
Postsecondary Number: I480201

01.0 DEMONSTRATE PROFICIENCY IN PERFORMING CLERICAL ADMINISTRATIVE SUPPORT OPERATIONS--The student will be able:

- 01.01 Establish sequence of job operations.
- 01.02 Apply basic safety rules.
- 01.03 Use printer's measurements to compute inches and fractions, points and picas, decimals, percentages, and proportions.
- 01.04 Use job information jacket.
- 01.05 Identify characteristics of printing papers to specify basic weights, sizes, and grades.
- 01.06 Perform routine maintenance in accordance with manufacturer specifications and established maintenance schedule.
- 01.07 Comply with established waste and spoilage control measures.
- 01.08 Demonstrate use of material safety data sheets.
- 01.09 Demonstrate proper handling of hazardous waste and chemicals.

02.0 DEMONSTRATE PROFICIENCY IN PERFORMING MECHANICAL CREATIVE SUPPORT OPERATIONS--The student will be able to:

- 02.01 Identify the equipment, tools, and materials used in design and copy preparation and the safety rules pertaining to each.
- 02.02 Prepare thumbnail layouts.
- 02.03 Prepare rough layouts.
- 02.04 Prepare comprehensive layouts including a finished working dummy.
- 02.05 Size and proportion photographs, line drawings, and other copy elements.
- 02.06 Copyfit and mark up (specify type sizes and styles).
- 02.07 Prepare computer typesetting equipment for operation.
- 02.08 Operate typesetting equipment.
- 02.09 Prepare typesetting processor.
- 02.10 Process typeset copy.
- 02.11 Proofread typeset output.
- 02.12 Paste up mechanical elements including keyline for photographs, tint blocks and ruling.
- 02.13 Prepare tissue overlay and specify color break, tint percentages and reverses.
- 02.14 Check and compare completed mechanical to comprehensive layouts for final proofing.
- 02.15 Prepare desk-top publishing equipment for operations.
- 02.16 Operate desk-top publishing equipment.

02.17 Proofread desk-top copy.
02.18 Modify existing copy utilizing desk-top publishing equipment.
02.19 Prepare multiple-page copy utilizing desk-top publishing equipment.

03.0 DEMONSTRATE PROFICIENCY IN PERFORMING PRE-PRESS OPERATIONS--The student will be able to:

03.01 Identify the equipment and materials used in reproduction photography and the safety rules pertaining to each.
03.02 Apply basic principles of photosensitometry, orthochromatic, and panchromatic (including use of gray scale).
03.03 Apply basic principles of light pertaining to copy board illuminations and exposure calculations for all camera functions.
03.04 Apply basic principles of camera optics as pertains to exposure control and focus, and camera extensions pertaining to reductions and enlargements.
03.05 Identify the parts of the process camera and explain their use.
03.06 Apply basic principles of darkroom chemistry.
03.07 Prepare darkroom chemistry.
03.08 Establish basic line exposure and exposure time at 100 percent using standard time and temperature development.
03.09 Apply basic principles of Kodak halftone computer and density guide.
03.10 Establish basic exposures to determine screen range, basic flash, main exposure, and bump exposure at 100 percent using standard time and temperature development.
03.11 Produce line negatives to size.
03.12 Inspect and compare line negatives to original mechanical.
03.13 Produce halftones to size.
03.14 Inspect and compare halftones to original copy.
03.15 Make line and halftone diffusion transfer prints.
03.16 Inspect and compare prints to original mechanical.
03.17 Apply basic principles of additive and subtractive color pertaining to the use of filters.
03.18 Use filters to hold/delete colors on line shots at 100 percent using standard time and temperature development.
03.19 Identify the parts of a contact frame and point light source and explain their use.
03.20 Produce contacts using orthochromatic and duplicating film, transmission density guide and standard time and temperature development.
03.21 Identify equipment and materials used in the stripping function and the safety rules pertaining to each.
03.22 Apply basic principles of stripping using a T-square and triangle to align, position, and tape film (emulsion side up) on ruled or unruled plastic or paper masking sheets; open windows; and opaque on the emulsion side.
03.23 Strip 1-color, 1-up layouts.

03.24 Strip 1-color, multiple layouts.
03.25 Strip 1-color, step layouts
03.26 Strip 1-color, 4-page layouts
03.27 Strip 1-color, 8-page layouts
03.28 Strip multiple burn layout (halftone and screen tints).
03.29 Strip multiple flat color layout.
03.30 Inspect and compare flats to original mechanical.
03.31 Identify equipment and materials used in proofing and platemaking to obtain proper exposures using a transmission density guide for processing photosensitive additive or subtractive paper or metal plates.
03.32 Produce proofs on diazo or silver paper.
03.33 Process proofs.
03.34 Inspect and compare proofs to the original mechanical.
03.35 Produce additive or subtractive paper or metal plates.
03.36 Process plates.
03.37 Inspect and compare plates to proofs.
03.38 File, handle, and retrieve flats and plates.

04.0 DEMONSTRATE PROFICIENCY IN PERFORMING OFFSET PRESS OPERATIONS--The student will be able to:

04.01 Identify the equipment and material used in offset press operations, their parts and functions, and the safety rules relating to their operation.
04.02 Apply basic principles of offset lithography pertaining to physical and chemical properties of ink components (pigment, vehicle, and dryer).
04.03 Apply basic principles of offset lithography pertaining to dampening systems (ducted and continuous).
04.04 Apply basic principles of offset lithography pertaining to fountain solutions chemical components (acid, alkaline, and neutral).
04.05 Apply basic principles of offset lithography pertaining to ph-control and its effects on the lithographic process.
04.06 Apply basic principles of offset lithography pertaining to interrelationships upon the process of paper (coated and uncoated and various grades within).
04.07 Apply basic principles of offset lithography pertaining to the inter-relationships of textured or smooth paper; paper, plastic, metal plates; and conventional or compressible blankets.
04.08 Apply basic principles of offset lithography pertaining to ink and its drying properties in relation to fountain solution, plate and paper used (including effects of ink film thickness and drying time and set off; and problems associated with inappropriate use of spray powder).
04.09 Apply basic principles of plate preservation after presswork for long-term storage (use of gum arabic and asphaltum).
04.10 Prepare press for operation by reviewing job-ticket specifications and then selecting appropriate press and materials.

04.11 Prepare press for operation based on interrelationships of lithographic process.
04.12 Mix fountain solution from concentrate.
04.13 Mix ink to PMS (Pantone Matching System) specifications
04.14 Introduce ink and fountain solution to press in proper sequence.
04.15 Set up and adjust feeder to paper specifications (air blast, vacuum, and choke).
04.16 Set up and adjust register system to single sheet or stream fed, side guide, and head register.
04.17 Set up and adjust delivery (chute or chain).
04.18 Mount blanket (pack if necessary) and adjust to press specifications.
04.19 Mount blanket (pack if necessary) and adjust to press specifications.
04.20 Set impression cylinder to paper thickness and press specifications.
04.21 Set and adjust ink and water rollers pressures to press specifications.
04.22 Make-ready press to assure ink and water balance for uniform coverage, volume and replenishment of ink, image position, cylinder pressure, and sheet registration.
04.23 Inspect and evaluate final make-ready sheet to job-ticket specifications and obtain proof approval to run.
04.24 Set spray powder.
04.25 Produce required number of press sheets to job-ticket specifications.
04.26 Preserve plate for long-term storage.
04.27 Perform press wash-up.
04.28 Perform press maintenance to manufacturers' specifications.

05.0 DEMONSTRATE PROFICIENCY IN PERFORMING FINISHING/BINDING OPERATIONS--The student will be able to:

05.01 Identify the equipment and materials used in finishing/binding operations, their parts and functions, and the safety rules relating to their operation.
05.02 Apply basic principles of finishing/binding operations pertaining to progress paper cutting, post press paper cutting and post bindery cutting (after folding, stitching, etc.
05.03 Apply basic principles of finishing/binding operations pertaining to sheet cutting.
05.04 Apply basic principles of finishing/binding operations pertaining to grain, caliper, and finish (coated or uncoated) of paper.
05.05 Apply basic principles of finishing/binding operations pertaining to signature configurations.
05.06 Apply basic principles of finishing/binding operations pertaining to knife and buckle folding.
05.07 Apply basic principles of finishing/binding operations pertaining to scoring and perforating.

05.08 Apply basic principles of finishing/binding operations pertaining to collating and gathering.

05.09 Apply basic principles of finishing/binding operations pertaining to binding alternatives (saddle, side, perfect, comb, spiral, case, etc).

05.10 Apply basic principles of finishing/binding operations pertaining to adhesive binding (padding and fan-apart)

05.11 Apply basic principles of finishing/binding operations pertaining to packaging and identification.

05.12 Demonstrate methods of counting sheets(machine, measurement, weight, and rapid multiple-sheet manual counting by fives).

05.13 Hand-jog 8 12" x 11" sheets.

05.14 Hand-jog 17" x 22" and larger sheets.

05.15 Machine jog sheets

05.16 Prepare rule-out of press sheet for finishing operations according to job-ticket specifications and approved proof.

05.17 Set up and operate cutter in accordance with rule-out.

05.18 Prepare folding dummy from press sheet in accordance with job-ticket specifications and approved proof.

05.19 Set up and operate folder in accordance with job-ticket specifications and folding dummy.

05.20 Make a single fold.

05.21 Make a multiple parallel fold.

05.22 Make a right angle fold.

05.23 Identify and define slitting, perforating, and scoring functions pertaining to folding operations.

05.24 Define collating flat sheets.

05.25 Define gathering of signatures.

05.26 Set up and operate stitcher (side and saddle).

05.27 Set up and operate comb binding machine.

05.28 Perform paper padding functions.

05.29 Define perfect, spiral, and case binding.

05.30 Set up and operate a paper drill for standard looseleaf binder.

05.31 Define die-cutting, embossing, foil stamping, and numbering.

05.32 Package and identify completed job according to job-ticket specifications.

06.0 DEMONSTRATE THE ABILITY TO PERFORM SUPPORT OPERATIONS FOR LABORATORY PROJECTS-The student will be able to:

06.01 Plan a production schedule for projects and estimate time for completion.

06.02 Schedule department functions according to production schedule.

06.03 Prepare a job cost estimate for each project based on established machine hourly rate.

06.04 Perform supervisory functions.

06.05 apply basic principles of hyphenation and justification to typesetting.

06.06 Prepare and produce columnar typeset copy of typesetter in manual mode, making line-ending decisions and comparing with typeset copy set in the automatic mode.

06.07 Explain reasons for making line-ending decisions when preparing and producing columnar typeset copy on typesetter in manual mode.

06.08 Set ruled from with headings.

06.09 Set a one-column run-a-round right.

06.10 Set a one-column run-a-round left.

06.11 Set kerned headlines.

06.12 Set letter spaced headlines.

06.13 Set a series of (existing student formatted) projects that output as camera ready art.

06.14 Proofread all typeset output projects and mark corrections with proofreaders' marks.

06.15 Paste up a complete mechanical following a folded, not bound imposition allowing for bleeds and trims; i.e. brochure or four-page layout.

06.16 Apply basic principles of paste-up following folded bound signature imposition and allow for lips, trims and bleeds according to saddle and side-stitch binding method.

06.17 Apply basic principles of paste-up following folded bound signature imposition and allow for lips, trims and bleeds according to perfect binding method.

06.18 Apply basic principles of paste-up following folded bound signature imposition and allow for lips, trims and bleeds according to spiral binding method.

06.19 Apply basic principles of paste-up following folded bound signature imposition and allow for lips, trims and bleeds according to comb binding method.

06.20 Apply basic principles of paste-up following folded bound signature imposition and allow for lips, trims and bleeds according to case binding method.

06.21 Explain differences in complexities of multiple signature impositions dependent on binding method used.

06.22 Proofread and mark up mechanical using proofreaders' marks on tissue overlay.

06.23 Perform supervisory functions.

07.0 DEMONSTRATE THE ABILITY TO PERFORM PRE-PRESS OPERATIONS FOR LABORATORY PROJECTS--The student will be able to:

07.01 Produce line negatives from substandard weak density copy using such alternatives as time and temperature variations, filters, filter variations and film reversal methods.

07.02 Produce line negatives from substandard colored copy using such alternatives as time and temperature variations, filters, filter variations and film reversal methods.

07.03 Produce line negatives from substandard reverse copy using such alternatives as time and temperature variations, filters, filter variations and film reversal methods.

07.04 Produce line negatives from substandard mechanicals using such alternatives as time and temperature variations, filters, filter variations and film reversal methods.

07.05 Produce halftone negatives using black and white photos with density ranges less than, equal to and much greater than the density range of the screen.

07.06 Predetermine results of producing halftone negatives from substandard copy by using the Kodak Graphic Arts Computer.

07.07 Predetermine tone value shifts needed to reproduce more lifelike results from substandard copy.

07.08 Apply basic principles of shooting fluorescent copy in line and halftone negatives.

07.09 Use visual inspection method of development to establish basic halftone exposure from a color photograph to establish highlight area.

07.10 Apply basic principles to obtain necessary tonal sifts based on evaluation of correct highlight halftone.

07.11 Produce spreads using contacting methods.

07.12 Produce chokes using contacting methods.

07.13 Produce screen tints using contacting methods.

07.14 Produce reverses using contacting methods.

07.15 Apply basic principles of stripping following folded bound signature imposition and allow for lips, trims and bleeds according to saddle and side-stitch binding method.

07.16 Apply basic principles of stripping following folded bound signature imposition and allow for lips, trims and bleeds according to perfect binding method.

07.17 Apply basic principles of stripping following folded bound signature imposition and allow for lips, trims and bleeds according to spiral binding method.

07.18 Apply basic principles of stripping following folded bound signature imposition and allow for lips, trims and bleeds according to comb binding method.

07.19 Apply basic principles of stripping following folded bound signature imposition and allow for lips, trims and bleeds according to case binding method.

07.20 Explain the difference in complexities of multiple signature impositions dependent on the binding method.

07.21 Produce tint blocks using rubylith.

07.22 Produce silhouettes using rubylith.

07.23 Produce reverses using rubylith.

07.24 Produce halftone windows using rubylith.

07.25 Predetermine screen values and standard screen angles from color wheel or Graphic Arts Technical Foundation (GATF) color communicator.

07.26 Produce multicolor flats to reproduce various colors by use of overprinting screen tints utilizing a pin register system.

07.27 Perform supervisory functions.

08.0 DEMONSTRATE THE ABILITY TO PERFORM OFFSET PRESS OPERATIONS FOR LABORATORY PROJECTS--The student will be able to:

08.01 Apply basic principles of offset press operations with regard to work and turn, work and tumble and sheet wise printed products.
08.02 Produce a tight register one-color project.
08.03 Product a tight register one- or two-color, precollated carbonless project.
08.04 Produce a two-color tight register project.
08.05 Produce a one- or two-color tight register envelope project.
08.06 Produce a tight register one-color metallic ink project.
08.07 Produce a tight register one- or two-color folding two-sided project.
08.08 Produce a multicolor tight register project.
08.09 Perform supervisory functions.

09.0 DEMONSTRATE THE ABILITY TO PERFORM FINISHING/BINDING OPERATIONS FOR LABORATORY PROJECTS--The student will be able to:

09.01 Apply basic principles of finishing and binding following folded bound signature impositions to allow for lips, trims and bleeds according to saddle- and side-stitch binding method.
09.02 Apply basic principles of finishing and binding following folded bound signature impositions and allow for lips, trims and bleeds according to perfect binding method.
09.03 Apply basic principles of finishing and binding following folded bound signature impositions and allow for lips, trims and bleeds according to spiral binding method.
09.04 Apply basic principles of finishing and binding following folded bound signature impositions and allow for lips, trims and bleeds according to comb binding method.
09.05 Apply basic principles of finishing and binding following folded bound signature impositions and allow for lips, trims and bleeds according to case binding method.
09.06 Explain the difference in complexities of multiple signature impositions dependent on binding method.
09.07 Perform supervisory functions.

10.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

10.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
10.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
10.03 Read and follow written and oral instructions.
10.04 Answer and ask questions coherently and concisely.
10.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
10.06 Demonstrate appropriate telephone/communication skills.

11.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

11.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

11.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

11.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

11.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

11.05 Demonstrate an understanding of federal, state and local taxes and their computation.

12.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

12.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

12.02 Draw conclusions or make inferences from data.

12.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

12.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

13.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

13.01 Conduct a job search.

13.02 Secure information about a job.

13.03 Identify documents that may be required when applying for a job.

13.04 Complete a job application form correctly.

13.05 Demonstrate competence in job interview techniques.

13.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.

13.07 Identify acceptable work habits.

13.08 Demonstrate knowledge of how to make job changes appropriately.

13.09 Demonstrate acceptable employee health habits.

13.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

14.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

14.01 Define entrepreneurship.

14.02 Describe the importance of entrepreneurship to the American economy.

14.03 List the advantages and disadvantages of business ownership.

14.04 Identify the risks involved in ownership of a business.

14.05 Identify the necessary personal characteristics of a successful entrepreneur.

14.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Professional Pilot Technology
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	N/A
	PSV
CIP Number	0649.010200
Grade Level	College Credits
Length	A.S. Degree

I. **PURPOSE:** The purpose of this program is to prepare students for initial employment with occupational titles as aircraft pilot, airplane pilot, commercial (196.263-014), or to provide supplemental training for persons previously or currently employed in these occupations.

The content should include, but not be limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, Federal Aviation Administration pilot certification procedures, aircraft systems and components, flight safety, applied physics and aerodynamics, and instrumentation.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Pilot Technology industry; planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Classroom and laboratory activities are an integral part of this program and provide instruction in preflight preparation, primary flight, instrument and flight maneuvering, and commercial pilot preparation.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate an understanding of safe and efficient work practices.
02.0 Demonstrate an understanding of fundamentals of aeronautics.
03.0 Understand and explain Federal Aviation Administration pilot certification procedures.
04.0 Demonstrate understanding of meteorology.
05.0 Demonstrate knowledge of aircraft communication equipment.
06.0 Demonstrate knowledge and an understanding of aircraft engine systems.
07.0 Solve navigation problems.
08.0 Demonstrate understanding of Federal Aviation Administration flight rules and regulations.
09.0 Demonstrate proficiency in instrument assisted flight.
10.0 Interpret Federal Aviation Administration in route and terminal flight charts.
11.0 Demonstrate knowledge of aircraft weight and balance computations.
12.0 Demonstrate appropriate communication skills.
13.0 Demonstrate appropriate math skills.
14.0 Demonstrate appropriate understanding of basic science.
15.0 Demonstrate employability skills.
16.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Professional Pilot Technology
Secondary Number:
Postsecondary Number: 0649.010200

01.0 DEMONSTRATE AN UNDERSTANDING OF SAFE AND EFFICIENT WORK PRACTICES--The student will be able to:

- 01.01 Demonstrate an awareness and understanding of health and safety hazards, prevention and correction of ecological problems and know the solutions unique to the industry.
- 01.02 Demonstrate an awareness and understanding of fueling hazards.
- 01.03 Demonstrate an awareness and understanding of physical hazards.
- 01.04 Demonstrate an awareness and understanding of fire hazards.
- 01.05 Demonstrate an awareness of and the ability to control and extinguish fires.
- 01.06 Demonstrate an awareness and understanding for the need of safety devices, controls, guards and equipment.
- 01.07 Demonstrate awareness, understanding and use of personal safety devices such as goggles, masks, helmets, hearing protectors, air respirators and protective clothing.

02.0 DEMONSTRATE AN UNDERSTANDING OF FUNDAMENTALS OF AERONAUTICS--The student will be able to:

- 02.01 Differentiate between aeronautics and aerodynamics.
- 02.02 State and give examples of Newton's three laws of motion.
- 02.03 Name and compare the four forces of flight.
- 02.04 Describe an airfoil.
- 02.05 Tell how lift is produced.
- 02.06 Discuss how and why an airplane stalls.
- 02.07 Describe and explain how pilot, vacuum, pressure and engine instruments work.
- 02.08 Explain the magnetic compass.

03.0 UNDERSTAND AND EXPLAIN FEDERAL AVIATION ADMINISTRATION PILOT CERTIFICATION PROCEDURES--The student will be able to:

- 03.01 Explain major portion of Parts 1, 61, 67, 91 and 830 of the Federal Aviation Regulations.

04.0 DEMONSTRATE UNDERSTANDING OF METEOROLOGY--The student will be able to:

- 04.01 State the correct names of the major civilian and military weather organizations.
- 04.02 Name and tell the function of at least three instruments meteorologists use in gathering weather data.

04.03 Name and give a general description of two types of weather satellites.

04.04 Interpret weather surface charts, station sequence reports, terminal reports and area forecasts.

05.0 DEMONSTRATE KNOWLEDGE OF AIRCRAFT COMMUNICATION EQUIPMENT--The student will be able to:

05.01 Use and explain function of VHF radios.

05.02 Use and explain function of UHF radios.

05.03 Explain function and frequencies of ELT's.

05.04 Use proper phraseology in using radios.

05.05 Discuss uses and limitations of portable transceivers.

06.0 DEMONSTRATE KNOWLEDGE AND AN UNDERSTANDING OF AIRCRAFT ENGINE SYSTEMS--The student will be able to:

06.01 Describe and identify reciprocating and turbine engine components.

06.02 Compute displacement, compression ration, volumetric efficiency and I.H.P. problems.

06.03 Describe and sketch a basic float type carburetor.

06.04 Describe the advantages of a fuel injected engine.

06.05 Describe a typical lubrication system on an opposed engine.

06.06 Describe a typical magneto ignition system including proper magneto checks.

06.07 Describe the difference between a normally aspirated engine and one that is supercharged.

06.08 Demonstrate basic operation of an aircraft engine including proper interpretation of instruments and operation of throttle, mixture control, carburetor heat control and prop control.

07.0 SOLVE NAVIGATION PROBLEMS--The student will be able to:

07.01 Define radio navigation.

07.02 Explain the magnetic compass.

07.03 Explain VOR navigation

07.04 Explain the ADF.

07.05 Explain DME and RNAV principles.

07.06 Demonstrate usage of magnetic coordinates.

07.07 Demonstrate and explain the flight computer.

07.08 Explain sectional charts and their use.

07.09 Explain in route and terminal charts.

07.10 Explain lost communications emergency procedures VFR and IFR.

07.11 Read and interpret aircraft performance charts.

07.12 Plot and explain a cross country course.

08.0 DEMONSTRATE UNDERSTANDING OF FEDERAL AVIATION ADMINISTRATION FLIGHT RULES AND REGULATIONS--The student will be able to:

08.01 Explain major portions of Parts 1, 61, 67, 91 and 830 of the Federal Aviation Rules and Regulations.

09.0 DEMONSTRATE PROFICIENCY IN INSTRUMENT ASSISTED FLIGHT--The student will be able to:

09.01 Define Instrument Flight Rules.
09.02 Demonstrate proper usage of radio communications.
09.03 Demonstrate proper use of navigation equipment.
09.04 Explain how IFR flight differs from VFR.
09.05 Demonstrate proper navigation by instruments using a flight simulator.

10.0 INTERPRET FEDERAL AVIATION ADMINISTRATION IN ROUTE AND TERMINAL FLIGHT CHARTS--The student will be able to:

10.01 Explain enroute and terminal chart legends.
10.02 Demonstrate and explain an enroute chart.
10.03 Demonstrate and explain a terminal chart.
10.04 Explain an approach plate.
10.05 Define SID's and STAR's.

11.0 DEMONSTRATE KNOWLEDGE OF AIRCRAFT WEIGHT AND BALANCE COMPUTATIONS--The student will be able to:

11.01 Define weight and balance.
11.02 Define center of gravity, moment, datum line, CG envelope, basic empty weight and gross weight.
11.03 Use calculator and performance charts.
11.04 Solve given weight and balance problems.

12.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

12.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
12.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
12.03 Read and follow written and oral instructions.
12.04 Answer and ask questions coherently and concisely.
12.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
12.06 Demonstrate appropriate telephone/communication skills.

13.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

13.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
13.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
13.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

13.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

13.05 Demonstrate an understanding of federal, state and local taxes and their computation.

14.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

14.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

14.02 Draw conclusions or make inferences from data.

14.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

14.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

15.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

15.01 Conduct a job search.

15.02 Secure information about a job.

15.03 Identify documents which may be required when applying for a job interview.

15.04 Complete a job application form correctly.

15.05 Demonstrate competence in job interview techniques.

15.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

15.07 Identify acceptable work habits.

15.08 Demonstrate knowledge of how to make appropriate job changes.

15.09 Demonstrate acceptable employee health habits.

15.10 Demonstrate knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

16.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

16.01 Define entrepreneurship.

16.02 Describe the importance of entrepreneurship to the American economy.

16.03 List the advantages and disadvantages of business ownership.

16.04 Identify the risks involved in ownership of a business.

16.05 Identify the necessary personal characteristics of a successful entrepreneur.

16.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Quality Assurance Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.070200
Grade Level	College Credits
Length	AS Degree

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as quality control technicians (012.261-014), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, use of equipment and tools, mathematics, work planning and layout, manufacturing processes, welding, machining and metal fabrication and methods of evaluating manufactured products.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Quality Assurance industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in the use of inspection tools, sketching, manufacturing control processes, layout and sampling, and testing processes.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate appropriate shop safety.
02.0 Explain quality control concepts.
03.0 Use and maintain tools and equipment.
04.0 Perform mathematical calculations.
05.0 Read and interpret blueprints.
06.0 Lay out work.
07.0 Explain basic machining terms and operations.
08.0 Develop sketches from oral descriptions and/or written information.
09.0 Define or explain basic welding terms and concepts.
10.0 Evaluate welds and identify metals.
11.0 Identify and describe welding processes.
12.0 Explain metal fabrication process.
13.0 Explain machining fabrication process.
14.0 Demonstrate appropriate communication skills.
15.0 Demonstrate appropriate understanding of basic science.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Quality Assurance Technology
Secondary Number:
Postsecondary Number: 0615.070200

01.0 DEMONSTRATE APPROPRIATE SHOP SAFETY--The student will be able to:

01.01 Demonstrate an awareness and understanding of health and safety hazards, prevention, correction and ecological problems and solution unique to quality control and reliability processes and systems.
01.02 Demonstrate an understanding of physical hazards.
01.03 Demonstrate an understanding of chemical hazards.
01.04 Demonstrate an understanding of biological and biomechanical hazards.
01.05 Demonstrate an awareness and understanding of fire hazards in manufacture, processing, and fabrication.
01.06 Demonstrate an understanding and procedures to control and extinguish NFPA classes of fire.
01.07 Demonstrate an awareness and understanding for the need and use of safety devices, controls, guards and equipment.
01.08 Demonstrate awareness, understanding and use of personal safety protection and devices including but not limited to goggles, safety glasses, masks, helmets, hearing protectors, air respirators, protective clothing, safety shoes and mesh gloves.
01.09 Demonstrate administration of first air procedures and accident procedures.
01.10 Demonstrate an understanding of the laws and agencies which regulate and establish safety standards including: National Safety Council (NSC), Occupational Safety and Health Administration (OSHA), National Institute of Occupational Safety and Health (NIOSH), American National Standards Institute (ANSI), National Fire Protection Association (NFPA), Underwriters Laboratories (UL), Mining Enforcement and Safety Administration (MESA), Power Tool Institute (PI), Hand Tool Institute (HTI), U.S. Consumer Products Safety Commission (CPSC), American Society of Mechanical Engineers (ASME), American Society of Agricultural Engineers (ASAF), American Society for Testing and Materials (ASTM).
01.11 Demonstrate safe use of chemicals and solvents.
01.12 Demonstrate safe use of measuring tools and hand tools.
01.13 Demonstrate safe use of portable power tools.
01.14 Demonstrate safe use of powered equipment.
01.15 Demonstrate safe storage of materials, tools, equipment and personal safety equipment.
01.16 Demonstrate disposing of waste materials.
01.17 Demonstrate safe housekeeping practices at work stations.

01.18 Demonstrate safe practices for lifting, moving and handling materials and equipment.

01.19 Demonstrate an understanding of Workers Compensation Law, workers liability and responsibilities at a work site.

02.0 EXPLAIN QUALITY CONTROL CONCEPTS--The student will be able to:

02.01 Demonstrate an understanding of the relationships between human motivation, product production, product quality, product production costs, moral and plan efficiency.

02.02 Demonstrate an understanding of the inspection processes, requirements and systems.

02.03 Demonstrate an understanding of the purposes of quality control.

02.04 Demonstrate an understanding of in-process inspection and methods to perform in-process inspections.

02.05 Demonstrate an understanding of workers' and inspectors' roles and responsibilities to ensure quality.

02.06 Demonstrate an understanding of trial run and production run.

02.07 Demonstrate an understanding of processes and techniques to ensure reliability of products.

03.0 USE AND MAINTAIN TOOLS AND EQUIPMENT--The student will be able to:

03.01 Identify safe and unsafe hand tools.

03.02 Demonstrate ability to maintain safe tools.

03.03 Demonstrate ability to use hand tools safely.

03.04 Identify safe and unsafe testing equipment.

03.05 Demonstrate procedures to follow when unsafe testing equipment is to be used on-line.

03.06 Demonstrate safe use of testing equipment used for tensile-compression testing, bending testing, impact testing, fatigue testing, shear testing, hardness testing, liquid-penetrant testing, radiographic testing, ultrasonic testing, magnetic-analysis testing, electrical-analysis testing, X-ray and Gamma ray testing.

03.07 Demonstrate an understanding of safety considerations workers must apply when using tools and equipment.

03.08 Demonstrate proper use of safety equipment and personal safety devices relative to the tools and equipment to be used.

03.09 Demonstrate ability to clean, adjust, calibrate and set up testing equipment for safe use.

03.10 Demonstrate ability to select proper tools and equipment for materials and products to be tested or inspected.

04.0 PERFORM MATHEMATICAL CALCULATIONS--The student will be able to:

04.01 Demonstrate the ability to apply arithmetic.

04.02 Demonstrate the ability to apply basic algebra and applied algebra, including foundations of geometry.

04.03 Demonstrate the ability to apply trigonometry.

04.04 Demonstrate the ability to use standard and metric measurements and notes.

04.05 Demonstrate practical applications of mathematics.

05.0 READ AND INTERPRET BLUEPRINTS--The student will be able to:

05.01 Use working drawings which include detail and assembly drawings.

05.02 Use and interpret information on exterior view, sectional view, auxiliary views, balloon drawings, exploded views, perspective drawings, line diagrams, charts, graphs, pert charts, CAD/CAM and CAMM programs.

05.03 Describe, identify and use symbols and abbreviations.

05.04 Use and interpret field notes, technical manual information, bulletins and specifications.

05.05 Modify and perform field changes to original information from written or verbal instructions.

05.06 Read/convert and use English and metric measurements.

05.07 Use English and metric measuring tools, scales and instruments.

05.08 Use English and metric conversion and reference charts, tables and graphs.

06.0 LAY OUT WORK--The student will be able to:

06.01 Use drawings, blueprints, specifications and other required information to plan a proper sequence to determine the quality of a product and test its reliability.

06.02 Select appropriate methods, tools and equipment to perform quality and reliability tests.

06.03 Prepare a written procedure for a particular product quality and reliability tests.

06.04 Prepare a written inspection procedure for production lines.

06.05 Prepare a product evaluation procedure incorporating quality and reliability testing, production line trial run information and prototype expectations.

06.06 Prepare final documentation for approval and acceptance for product production runs.

07.0 EXPLAIN BASIC MACHINING TERMS AND OPERATIONS--The student will be able to:

07.01 Identify the parts of and explain the differences between: engine lathe, speed lathe, toolroom lathe, tracer lathes, turret lathe, automatic chucking lathe and automatic screw machine.

07.02 Identify the parts of and explain the differences between milling machines, including: column-knee, fixed bed, planer type, duplicating mills, hobbing machine.

07.03 Identify the parts of and explain the differences between drilling machines, including: upright drilling machines, radial drilling machines, multiple-spindle drilling

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machines, gang drilling machines, two-way horizontal multiple-spindle drilling machines, deep-hole drilling machine and jig boring machine.

07.04 Identify the parts of and explain the differences between saws, including: reciprocating saws, band saws and circular saws.

07.05 Identify the parts of and explain the differences between grinding machines, including: surface grinders, cylindrical grinders and special grinding machines.

07.06 Identify the parts of and explain the differences between grinders, including: lapping, honing, drum and blasting.

07.07 List and define operations which machines in the following categories can perform: lathes, shapers, planers, broaches, mills, drills, saws and grinders.

08.0 DEVELOP SKETCHES FROM ORAL DESCRIPTIONS AND/OR WRITTEN INFORMATION--The student will be able to:

08.01 Translate verbal instruction into working notes.

08.02 Translate working notes into legible sketches.

08.03 Demonstrate use of appropriate symbols and abbreviations.

08.04 Demonstrate proper use of scales, triangles and graph papers.

08.05 Demonstrate use of symbols templates.

08.06 Demonstrate proper placement of appropriate production or change notations on sketches.

09.0 DEFINE OR EXPLAIN BASIC WELDING TERMS AND CONCEPTS--The student will be able to:

09.01 List welding terms and trade technology associated with the five major categories of welding which are: solid state, brazing, gas welding, resistance welding, arc welding and other processes.

09.02 Define trade terms and abbreviations commonly found in welding manual glossary.

09.03 List and define comparative difference between the five major welding methods.

10.0 EVALUATE WELDS AND IDENTIFY METALS--The student will be able to:

10.01 Evaluate the quality of welds by utilizing the following methods of testing welds: fracture test, tensile test, bend test, metallographic test, visual inspection, magnetic particle inspection, liquid penetrant tests, ultrasonic tests, radiographic test.

10.02 Identify the following types of weld defects: cracks, porosity, cold shut, inclusions, lack of fusion, and undercut.

10.03 Identify common metals visual test (form, weight, color, shape).

10.04 Identify metals using the following processes: spark test, chip test, melting temperature, magnet test and weight test.

11.0 IDENTIFY AND DESCRIBE WELDING PROCESSES--The student will be able to:

11.01 Identify, list and describe the following welding processes: carbon arc welding, shielded metal arc welding, flux cored arc welding, gas metal arc welding, gas tungsten arc welding, submerged arc welding, plasma arc welding, stud welding, percussion welding, upset welding, flash welding, projection welding, resistance seam welding, resistance spot welding, pressure gas welding, oxy-hydrogen welding, oxy-acetylene welding, dip brazing, resistance brazing, induction brazing, furnace brazing, torch brazing, infra-red brazing, cold welding, diffusion welding, explosion welding, forge welding, friction welding, ultrasonic welding, electron beam welding, electro-slag welding, induction welding, laser beam welding and thermit welding.

11.02 List and describe equipment, supplies and tools necessary to perform the processes listed above.

12.0 EXPLAIN METAL FABRICATION PROCESSES--The student will be able to:

12.01 List and describe procedures for preparing metal for fabrication.

12.02 List and describe processes for mechanically attaching metal together (light gauge and heavy gauge).

12.03 List and describe processes for physically bonding metal together.

13.0 EXPLAIN MACHINING FABRICATION PROCESSES--The student will be able to:

13.01 List and explain the processes and machines necessary to accomplish the following fabrication requirements: cutting, shaping, forming, turning, drilling, finishing, pressing, drawing, bending, shearing, slitting, rolling, forging, swaging, hobbing, coining, surfacing, extruding, braking, notching, nibbling, piercing, blanking, trimming, perforating, trueing, shaving.

13.02 List and explain the measuring tools, hand tools, machines and materials necessary to perform each of the fabrication processes listed above.

14.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

14.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.

14.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.

14.03 Read and follow written and oral instructions.

14.04 Answer and ask questions coherently and concisely.

14.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
14.06 Demonstrate appropriate telephone/communication skills.

15.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

15.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
15.02 Draw conclusions or make inferences from data.
15.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
15.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.
16.02 Secure information about a job.
16.03 Identify documents which may be required when applying for a job interview.
16.04 Complete a job application form correctly.
16.05 Demonstrate competence in job interview techniques.
16.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
16.07 Identify acceptable work habits.
16.08 Demonstrate knowledge of how to make job changes appropriately.
16.09 Demonstrate acceptable employee health habits.
16.10 Demonstrate knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define entrepreneurship.
17.02 Describe the importance of entrepreneurship to the American economy.
17.03 List the advantages and disadvantages of business ownership.
17.04 Identify the risks involved in ownership of a business.
17.05 Identify the necessary personal characteristics of a successful entrepreneur.
17.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Radio and Television Broadcast Programming
Occupational Area:	Industrial Education
	PSV
CIP Number	0610.010402
Grade Level	College Credits
Length	AS Degree

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare the student for employment as a broadcast director. The content includes but is not limited to: commercial or industrial TV and radio/studio assisting, camera operating, technical directing, producing video tape or film chain operating, audio controlling, gaffing, grip, or script writing.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Radio and Television industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Laboratory activities include the preparation and execution of both radio and TV production in the studio and in the field (ENG and EFP). Activity includes writing, story-boarding, setting up, rehearsing, and production. In addition, the student may take a three credit internship and work in a local TV or radio station, or an audio or video production house.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

Sixty-five credits are recommended for the A.S. Degree. Thirty-two credits should be taken in the major area.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate knowledge of the television production technology program instructional system, safety procedures and trade terminology.
02.0 Plan a set for television production.
03.0 Perform lighting activities for a planned production.
04.0 Operate studio color television camera.
05.0 Perform video tape recording and editing operations.
06.0 Perform television production and programming activities.
07.0 Perform character generator and special effects generator functions.
08.0 Operate television studio audio control system.
09.0 Perform electronic news gathering (ENG) and electronic field production (EFP) equipment functions.
10.0 Perform basic film operations.
11.0 Perform routine operator preventative maintenance operations.
12.0 Demonstrate appropriate communication skills.
13.0 Demonstrate appropriate math skills.
14.0 Demonstrate appropriate understanding of basic science.
15.0 Demonstrate employability skills.
16.0 Demonstrate appropriate broadcast speaking manner.
17.0 Operate control room equipment.
18.0 Demonstrate radio broadcasting skills.
19.0 Explain and demonstrate news broadcasting.
20.0 Write broadcast news.
21.0 Explain and demonstrate ability to properly control radio traffic.
22.0 Write commercial copy.
23.0 Explain programming concepts.
24.0 Describe business aspects of broadcasting.
25.0 Explain surveys and demographics.
26.0 Explain rules and regulations governing radio broadcasts.
27.0 Perform radio broadcasting functions.
28.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Radio And Television Broadcast Programming
Secondary Number:
Postsecondary Number: 0610.010402

01.0 DEMONSTRATE KNOWLEDGE OF THE TELEVISION PRODUCTION TECHNOLOGY PROGRAM INSTRUCTIONAL SYSTEM, SAFETY PROCEDURES AND TRADE TERMINOLOGY--The student will be able to:

- 01.01 Describe the operating system of the vocational program.
- 01.02 State and apply general safety rules for operation of equipment and learning activities in the lab.
- 01.03 Utilize trade terminology in the television production lab.
- 01.04 Utilize trade abbreviations and acronyms as appropriate.
- 01.05 Transport equipment safely and securely.
- 01.06 Store equipment in appropriate locations.

02.0 PLAN A SET FOR TELEVISION PRODUCTION--The student will be able to:

- 02.01 Prepare television set for a planned production.
- 02.02 Draw and design a set plan to scale.
- 02.03 Select and arrange stage props.
- 02.04 Utilize hand tools to construct scene components.
- 02.05 Inspect and repair scenery as needed.

03.0 PERFORM LIGHTING ACTIVITIES FOR A PLANNED PRODUCTION--The student will be able to:

- 03.01 Describe types of lighting fixtures.
- 03.02 Identify parts of lighting fixtures.
- 03.03 Perform special-effects lighting.
- 03.04 Set-up appropriate lighting for a production.
- 03.05 Describe functions of master lighting panel and dimmer board.
- 03.06 Operate master lighting panel to dimmer board.
- 03.07 Analyze lighting needs for production.
- 03.08 Describe dangers of high intensity studio lighting.
- 03.09 Understand lighting theory.

04.0 OPERATE STUDIO COLOR TELEVISION CAMERA--The student will be able to:

- 04.01 Describe major parts of a studio camera.
- 04.02 Align camera for a studio production.
- 04.03 Perform appropriate camera movements.
- 04.04 Operate camera for commercial recording.
- 04.05 Operate camera for studio production.
- 04.06 Perform floor director's functions.
- 04.07 Understand CCU Camera Control Unit.

05.0 PERFORM VIDEO TAPE RECORDING AND EDITING OPERATIONS--The student will be able to:

05.01 Identify and describe different video tape machines.
05.02 Describe operational parts of a video tape machine.
05.03 Operate video tape machine to record and playback.
05.04 Describe operational parts of a video cassette editor.
05.05 Perform assemble edits.
05.06 Perform insert edits.
05.07 Set up video tape machines.
05.08 Set up video cassette editor.
05.09 Recognize different video tape formats.

06.0 PERFORM TELEVISION PRODUCTION AND PROGRAMMING ACTIVITIES--The student will be able:

06.01 Operate master switcher.
06.02 Operate routing switcher for production and tape dubs.
06.03 Set up machines and tuner for in-house playback.
06.04 Develop script for a program.
06.05 Draw story board for a planned production.
06.06 Direct participants in production of a program.
06.07 Perform on-camera.
06.08 Act as producer to get program from idea to air.
06.09 Operate through the lens teleprompter.

07.0 PERFORM CHARACTER GENERATOR AND SPECIAL EFFECTS GENERATOR FUNCTIONS--The student will be able to:

07.01 Describe operational parts of character generator.
07.02 Set up character generator.
07.03 Describe inputs of special effects generator.
07.04 Operate special effects generator during production.
07.05 Operate character generator during production.
07.06 Demonstrate basic computer literacy.
07.07 Demonstrate knowledge of computer generated video graphics.

08.0 OPERATE TELEVISION STUDIO AUDIO CONTROL SYSTEM--The student will be able to:

08.01 Identify and select microphones for production.
08.02 Place microphones for maximum effect.
08.03 Describe parts of cartridge machine.
08.04 Set up cartridge machine for production.
08.05 Operate cartridge machine during recording and playback.
08.06 Describe parts of reel-to-reel tape machine.
08.07 Set up reel-to-reel tape and cassette tape machines for production.
08.08 Operate reel-to-reel tape and cassette tape machines for production.
08.09 Describe parts of a turntable.
08.10 Operate turntable for production.
08.11 Describe parts of audio mixing console.

08.12 Operate audio mixing console.
08.13 Operate cassette with search for production.
08.14 Operate compact disc sound source during production.

09.0 PERFORM ELECTRONIC NEWS GATHERING (ENG) AND ELECTRONIC FIELD PRODUCTION(EFP) EQUIPMENT FUNCTIONS--The student will be able to:

09.01 Describe ENG and EFP port-a-pac components.
09.02 Set up port-a-pac for field production.
09.03 Operate port-a-pac during production segments.
09.04 Complete a field production from writing to shooting to VCR electronic editing.

10.0 PERFORM BASIC FILM OPERATIONS--The student will be able to:

10.01 Operate film editor.
10.02 Edit film for time slot.
10.03 Describe parts of film island.
10.04 Set-up film island for production.
10.05 Demonstrate skill in both cut and paste editing and transfer to tape electronic editing.

11.0 PERFORM ROUTINE OPERATOR PREVENTATIVE MAINTENANCE OPERATIONS--The student will be able to:

11.01 Describe types of video connectors.
11.02 Describe types of audio connectors.
11.03 Assemble audio and video cables.
11.04 Clean tape heads on audio recording equipment.
11.05 Clean tape heads on video recording equipment.
11.06 Replace broken knobs.
11.07 Replace sliders and potentiometers.
11.08 Replace headshell/cartridge and balance tone arm.
11.09 Replace bulb in light fixture.

12.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

12.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
12.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
12.03 Read and follow written and oral instructions.
12.04 Answer and ask questions coherently and concisely.
12.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
12.06 Demonstrate appropriate telephone/communication skills.

13.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

13.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

13.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

13.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

13.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

13.05 Demonstrate an understanding of federal, state and local taxes and their computation.

14.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

14.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

14.02 Draw conclusions or make inferences from data.

14.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

14.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

15.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

15.01 Conduct a job search.

15.02 Secure information about a job.

15.03 Identify documents which may be required when applying for a job interview.

15.04 Complete a job application form correctly.

15.05 Demonstrate competence in job interview techniques.

15.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

15.07 Identify acceptable work habits.

15.08 Demonstrate knowledge of how to make job changes appropriately.

15.09 Demonstrate acceptable employee health habits.

15.10 Prepare a resume.

15.11 Prepare an audio audition tape (required).

15.12 Prepare a video audition tape (optional).

15.13 Write a letter of introduction.

15.14 Demonstrate a knowledge of Radio/TV career patterns.

15.15 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

16.0 DEMONSTRATE APPROPRIATE BROADCAST SPEAKING MANNER--The student will be able to:

16.01 Identify and correct his own vocal deficiencies.

16.02 Demonstrate his ability to breathe properly, project and control loudness, resonate his voice and vary tone, pitch and pace.

16.03 Articulate and pronounce words according to accepted standards.

16.04 Understand the basic elements of good speech.
16.05 Express feelings with voice.
16.06 Interpret copy for dramatic content.

17.0 OPERATE CONTROL ROOM EQUIPMENT--The student will be able to:

17.01 Demonstrate a working familiarity and understanding of the functions of an audio console (mixer).
17.02 State the characteristics of various microphone types and demonstrate the ability to use them.
17.03 Demonstrate knowledge of and ability to operate turntables, tape recorders, cart recorders and playbacks.
17.04 Handle remote sources through the console.
17.05 Demonstrate how to handle an audio portion of a deejay show and news program, putting together all the elements of audio control in radio.
17.06 Demonstrate ability to work as an audio control operator in TV or radio studio production.
17.07 Understand the ad-lib format and show proficiency in that style of broadcast.

18.0 DEMONSTRATE RADIO BROADCASTING SKILLS--The student will be able to:

18.01 Outline the qualifications and requirements of a radio announcer.
18.02 Demonstrate development of the skills of announcing, the various techniques of delivery and procedures according to accepted standards.
18.03 Demonstrate the ability to perform to standards before a TV camera, visually and orally.
18.04 Perform the various assignments in a professional manner, for both radio and TV, according to industry standards.

19.0 EXPLAIN AND DEMONSTRATE NEWS BROADCASTING--The student will be able to:

19.01 Differentiate between news, commentary, and editorials.
19.02 Demonstrate ability to mark, edit, and present news in an acceptable manner.
19.03 Demonstrate ability to use the various equipment of a newsroom.
19.04 Identify the various sources of news and how they are used.
19.05 Demonstrate ability to ad-lib from the scene, interview guests, and type news stories.
19.06 Understand and interpret criticism of broadcast news.

20.0 WRITE BROADCAST NEWS--The student will be able to:

20.01 List the elements that constitute news materials and evaluate them.
20.02 Demonstrate ability to write news stories in broadcast style.

20.03 Be able to use the broadcast style page format.
20.04 Understand the technique of using present of past perfect tense in writing broadcast news.

21.0 EXPLAIN AND DEMONSTRATE ABILITY TO PROPERLY CONTROL RADIO TRAFFIC--The student will be able to:

21.01 State the duties of the traffic department.
21.02 List the elements and procedures of log-keeping.
21.03 Demonstrate a working knowledge of the rules and regulations pertaining to traffic control and standards of performance.
21.04 Demonstrate the ability to create a program log.

22.0 WRITE COMMERCIAL COPY--The student will be able to:

22.01 Explain the job of a copy writer and outline the elements of good copy.
22.02 Demonstrate ability to write commercial continuity in its various forms.
22.03 Demonstrate ability to select and utilize music and sound effects in the production of recorded copy.
22.04 Demonstrate ability to edit, splice, dub, overlap sound or otherwise utilize various production techniques.

23.0 EXPLAIN PROGRAMMING CONCEPTS--The student will be able to:

23.01 List and explain the various functions under the control of the program director.
23.02 Differentiate between formats used in large and small markets.
23.03 Explain various methods of station promotion, including procedures and rules.
23.04 Explain the techniques and procedures of networks, syndication, news, talk, sports, special events, public service and music programs.
23.05 Identify the various music formats used in contemporary radio.
23.06 Understand FCC rules dealing with indecent programming and obscenity.

24.0 EXPLAIN BUSINESS ASPECTS OF BROADCASTING--The student will be able to:

24.01 Explain the determination of cost and expense involved in station operation, the financial structure, the evaluation of time to the station and its clients.
24.02 List procedures and techniques of radio sales and demonstrate the ability to use maps, rate cards, contracts, etc., in accordance with station practice.
24.03 Explain the requirements and regulations of station ownership.
24.04 Describe the development of media advertising and explain the various forms utilized in the industry today.

25.0 EXPLAIN SURVEYS AND DEMOGRAPHICS--The student will be able to:

25.01 Explain the methods of measurement used by broadcasters and evaluate their function in the overall operation of a station.

25.02 Outline the methodology of pulse, ARB, and explain the use of the SRDS.

26.0 EXPLAIN RULES AND REGULATIONS GOVERNING RADIO BROADCASTS--The student will be able:

26.01 Demonstrate an understanding of rules and regulations governing licenses, measurement and records, political broadcasts, and lottery laws.

26.02 Will show an understanding of the features in BROADCASTING magazine including the update on all Broadcasting litigation and lawmaking.

27.0 PERFORM RADIO BROADCASTING FUNCTIONS--The student will be able to:

27.01 Perform to high standards in the role of audio operator, announcer, deejay, newsman, interviewer and commercial production, in varied format situations.

28.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

28.01 Define entrepreneurship.

28.02 Describe the importance of entrepreneurship to the American economy.

28.03 List the advantages and disadvantages of business ownership.

28.04 Identify the risk involved in owning a business.

28.05 Identify the personal characteristics of a successful entrepreneur.

28.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Radio Broadcasting
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I100114**
CIP Number	0610.010401
Grade Level	30, 31
Length	750 hours
Certification	TEC ELEC ¶7 ¶G
	TV PRO TEC @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for initial employment with occupational titles as radio and television announcer (34017191), radio announcer (159.147-010), broadcast technicians (249.387-010), or to provide supplemental training for persons previously or currently employed in these occupations.

The content should include, but not be limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, announcing and moderating programs, preparing copy, programming, and operation of audio broadcasting equipment to support broadcast managers in the production of materials and production and broadcasting of materials or programs in radio format.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Radio industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in a wide variety of radio station positions to enhance the students' employability and versatility upon completion of the program. Lab activities include operation of equipment, copy writing spots, weather, news, sound effects, taping, editing, transfers, and voice and speech control.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

A Federal Communications Commission radio telephone third class license is required for employment in most positions in radio

stations. Appropriate preparation for the exam is a part of the content of this program.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 9.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 750 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate knowledge of procedures.
02.0 Demonstrate appropriate broadcast speaking manner.
03.0 Operate control room equipment.
04.0 Demonstrate radio broadcasting skills.
05.0 Explain and demonstrate news broadcasting.
06.0 Write broadcast news.
07.0 Explain and demonstrate ability to properly control radio traffic.
08.0 Write commercial copy.
09.0 Explain programming concepts.
10.0 Describe business aspects of broadcasting.
11.0 Explain surveys and demographics.
12.0 Explain rules and regulations governing radio broadcasts.
13.0 Perform radio broadcasting functions.
14.0 Demonstrate competencies required for Federal Communications Commission radio telephone third class license.
15.0 Demonstrate appropriate communication skills.

16.0 Demonstrate appropriate math skills.
17.0 Demonstrate appropriate understanding of basic science.
18.0 Demonstrate employability skills.
19.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Radio Broadcasting
Secondary Number:
Postsecondary Number: I100114

01.0 DEMONSTRATE KNOWLEDGE OF PROCEDURES--The student will be able to:

- 01.01 Verbalize the rules and procedures of school and class.
- 01.02 Explain the structure of the broadcast industry, the radio station, and student role in the station's operation.
- 01.03 State the nature of the instruction, identify what will be learned in relation to stated goals and job opportunities that exist.

02.0 DEMONSTRATE APPROPRIATE BROADCAST SPEAKING MANNER--The student will be able to:

- 02.01 Identify and correct vocal deficiencies.
- 02.02 Demonstrate ability to breathe properly, project and control loudness, resonate the voice and vary tone, pitch and pace.
- 02.03 Articulate and pronounce words according to accepted standards.
- 02.04 Read aloud in a professional manner.

03.0 OPERATE CONTROL ROOM EQUIPMENT--The student will be able to:

- 03.01 Demonstrate a working familiarity and understanding of the functions of a control console.
- 03.02 State the characteristics of various microphones and demonstrate the ability to use them.
- 03.03 Demonstrate knowledge of and ability to operate turntables, tape recorders, cart recorders and playbacks.
- 03.04 Handle outside organizations through the console.
- 03.05 Demonstrate how to handle the audio portion of a deejay show and news program, putting together all the elements of audio control in radio.
- 03.06 Demonstrate ability to work as an audio control operator in TV studio production.

04.0 DEMONSTRATE RADIO BROADCASTING SKILLS--The student will be able to:

- 04.01 Outline the qualifications and requirements of a radio announcer.
- 04.02 Demonstrate development of the skills of announcing, the various techniques of delivery and procedures according to accepted standards.
- 04.03 Demonstrate the ability to perform to standards before a TV camera, visually and orally.

04.04 Perform the various assignments in a professional manner, for both radio and TV, according to industry standards.

05.0 EXPLAIN AND DEMONSTRATE NEWS BROADCASTING--The student will be able to:

05.01 Differentiate between news, commentary, and editorials.
05.02 Demonstrate ability to mark, edit, and present news in an acceptable manner.
05.03 Demonstrate ability to use the various equipment of a newsroom.
05.04 Explain the various sources of news and how they are used.
05.05 Demonstrate ability to ad-lib from the scene, interview guests, and type news stories.

06.0 WRITE BROADCAST NEWS--The student will be able to:

06.01 List the elements that constitute news materials and evaluate them.
06.02 Demonstrate ability to write news stories in broadcast style.

07.0 EXPLAIN AND DEMONSTRATE ABILITY TO PROPERLY CONTROL RADIO TRAFFIC--The student will be able to:

07.01 State the duties of the traffic department.
07.02 List the elements and procedures of log-keeping.
07.03 Demonstrate a working knowledge of the rules and regulations pertaining to traffic control and standards of performance.

08.0 WRITE COMMERCIAL COPY--The student will be able to:

08.01 Explain the job of a copy writer and outline the elements of good copy.
08.02 Demonstrate ability to write commercial continuity in it various forms.
08.03 Demonstrate ability to select and utilize music and sound effects in the production of recorded copy.
08.04 Demonstrate ability to edit, splice, dub, overlap sound or otherwise utilize various production techniques.

09.0 EXPLAIN PROGRAMMING CONCEPTS--The student will be able to:

09.01 List and explain the various functions under the control of the program director.
09.02 Differentiate between formats used in large and small markets.
09.03 Explain various methods of station promotion, types of contests including procedures and rules.
09.04 Explain the techniques and procedures of networks, syndication, news, talk, sports, special events, public service and music programs.

10.0 EXPLAIN BUSINESS ASPECTS OF BROADCASTING--The student will be able to:

10.01 Explain the determination of cost and expense involved in station operation, the financial structure, the evaluation of time to the station and its clients.
10.02 List procedures and techniques of radio sales and demonstrate the ability to use maps, rate cards, contracts, etc., in accordance with station practice.
10.03 Explain the requirements and regulations of station ownership.
10.04 Describe the development of media advertising and explain the various forms utilized in the industry today.

11.0 EXPLAIN SURVEYS AND DEMOGRAPHICS--The student will be able to:

11.01 Explain the methods of measurement used by broadcasters and evaluate their function in the overall operation of a station.
11.02 Outline the methodology of pulse, ARB, and explain the use of the SRDS.

12.0 EXPLAIN RULES AND REGULATIONS GOVERNING RADIO BROADCASTS--The student will be able to:

12.01 Demonstrate an understanding of the rules and regulations governing licenses, measurement and records, political broadcasts, and lottery laws.

13.0 PERFORM RADIO BROADCASTING FUNCTIONS--The student will be able to:

13.01 Perform to high standards in the role of audio operator, announcer, deejay, newsman, interviewer and production man, in varied format situations.

14.0 DEMONSTRATE COMPETENCIES REQUIRED FOR FEDERAL COMMUNICATIONS COMMISSION RADIO-TELEPHONE THIRD CLASS LICENSE--The student will be able to:

14.01 Pass the examination (F.C.C.) for Radio-Telephone Operator's License (Third) with broadcast endorsement.

15.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

15.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
15.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
15.03 Read and follow written and oral instructions.
15.04 Answer and ask questions coherently and concisely.

15.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
15.06 Demonstrate appropriate telephone/communication skills.

16.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

16.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
16.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
16.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
16.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
16.05 Demonstrate an understanding of federal, state and local taxes and their computation.

17.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

17.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
17.02 Draw conclusions or make inferences from data.
17.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
17.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct a job search.
18.02 Secure information about a job.
18.03 Identify documents which may be required when applying for a job interview.
18.04 Complete a job application form correctly.
18.05 Demonstrate competence in job interview techniques.
18.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
18.07 Identify acceptable work habits.
18.08 Demonstrate knowledge of how to make job changes appropriately.
18.09 Demonstrate acceptable employee health habits.
18.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

19.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

19.01 Define entrepreneurship.

19.02 Describe the importance of entrepreneurship to the American economy.

19.03 List the advantages and disadvantages of business ownership.

19.04 Identify the risks involved in ownership of a business.

19.05 Identify the necessary personal characteristics of a successful entrepreneur.

19.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Recreational Vehicle Service Technician
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I470698**
CIP Number	0647.069900
Grade Level	30, 31
Length	1350 hours
Certification	REC VEH SR @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as recreational vehicle service technicians. This program also provides supplemental training for persons previously or currently employed in these occupations.

The course content will include the following: pre-delivery inspection, troubleshooting and repairing AC and DC electrical systems, freshwater systems, waste water systems, electrical brake systems, towing systems, suspension systems, vehicle interior, vehicle exterior, repair and service L.P systems, install vehicle accessories, service and repair appliances and air conditioning systems.

The content should include, but not be limited to, customer relations, communications, human relations, employability skills, and safe and efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Recreational Vehicle industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in servicing and repairing recreational vehicles.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this Postsecondary adult vocational program is: mathematics 9.0, language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1,350 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Introduce Recreational Vehicle Service skills.
02.0 Apply electrical skills.
03.0 Apply mathematics skills.
04.0 Perform the pre-delivery inspection.
05.0 Perform preventive maintenance.
06.0 Troubleshoot and repair RV fluid power systems.
07.0 Identify basic heating and mechanical principles.
08.0 Troubleshoot LP gas systems.
09.0 Troubleshoot and repair electrical/electronic systems.
10.0 Perform metal processing/metallurgy skills.
11.0 Troubleshoot and repair water system services.
12.0 Troubleshoot and repair electrical brake systems.
13.0 Troubleshoot and repair towing systems.
14.0 Troubleshoot and repair suspension system.
15.0 Troubleshoot and repair air conditioning systems.
16.0 Troubleshoot and repair absorption refrigerators.
17.0 Troubleshoot and repair heating systems.
18.0 Troubleshoot and repair water heaters.
19.0 Perform customer relations functions.
20.0 Troubleshoot and repair vehicle interior.
21.0 Troubleshoot and repair vehicle exterior.
22.0 Demonstrate employability skills.
23.0 Demonstrate an understanding of entrepreneurship.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Recreational Vehicle Service Technician
Secondary Number:
Postsecondary Number: I470698

01.0 INTRODUCE RECREATIONAL VEHICLE SKILLS--The student will be able to:

- 01.01 Complete orientation to recreational vehicle industry.
- 01.02 Apply basic safety procedures.
- 01.03 Use basic trade tools and equipment.
- 01.04 Apply industrial codes and standards.

02.0 APPLY ELECTRICAL SKILLS--The student will be able to:

- 02.01 Identify basic concepts of electrical circuits.
- 02.02 Use electrical component symbols and diagrams.
- 02.03 Identify component circuits and their requirements.
- 02.04 Use electrical test meters.
- 02.05 Use specialized hand tools.
- 02.06 Apply DC principles.
- 02.07 Apply soldering skills.
- 02.08 Apply AC principles.
- 02.09 Troubleshoot circuits containing electronic components.
- 02.10 Troubleshoot/diagnose electrical circuits and components.

03.0 APPLY MATHEMATICS SKILLS--The student will be able to:

- 03.01 Solve math problems involving fractions.
- 03.02 Solve math problems involving algebraic equations.
- 03.03 Use measurements.
- 03.04 Solve basic trigonometric problems.

04.0 PERFORM THE PRE-DELIVERY INSPECTION--The student will be able to:

- 04.01 Identify pre-delivery inspection procedures.
- 04.02 Perform electrical system inspection.
- 04.03 Perform LP gas system test.
- 04.04 Perform water and drainage system check-out.
- 04.05 Perform chassis, frame, and running gear inspection.

05.0 PERFORM PREVENTIVE MAINTENANCE--The student will be able to:

- 05.01 Perform under-the-hood inspections.
- 05.02 Service cooling and oil lubricating systems.
- 05.03 Perform general inspection and adjustments.
- 05.04 Prepare vehicle for storage inspection and trip preparation.

06.0 TROUBLESHOOT AND REPAIR RV FLUID POWER SYSTEMS--The student will be able to:

- 06.01 Identify the principles of hydraulics.

06.02 Identify hydraulic system components.
06.03 Troubleshoot, repair and replace hydraulic system components.
06.04 Identify principles of pneumatics.
06.05 Identify pneumatic system components.
06.06 Troubleshoot, repair and replace pneumatic system components.

07.0 IDENTIFY BASIC HEATING AND MECHANICAL PRINCIPLES--The student will be able to:

07.01 Explain basic principles of mechanical advantage.
07.02 Explain applications of energy converters.
07.03 Perform efficiency calculations.
07.04 Explain basic principles of heat.

08.0 TROUBLESHOOT LP GAS SYSTEMS--The student will be able to:

08.01 Identify properties of LP gas.
08.02 Identify RV propane system components and functions.
08.03 Inspect, purge, fill and test containers.
08.04 Inspect, replace, adjust propane system components.
08.05 Troubleshoot and repair LP gas systems.

09.0 TROUBLESHOOT AND REPAIR ELECTRICAL/ELECTRONICS SYSTEMS--The student will be able to:

09.01 Troubleshoot battery, alternator and charger.
09.02 Troubleshoot and repair 120 volt AC distribution system.
09.03 Troubleshoot 120 volt AC/12 volt converter systems.
09.04 Troubleshoot and repair 12 volt distribution system.
09.05 Perform gas engine generator tune up.
09.06 Troubleshoot and repair generator alternators.
09.07 Repair and install 12 volt motor and light fixtures.
09.08 Install and troubleshoot antenna.
09.09 Install and troubleshoot security system.
09.10 Troubleshoot and repair leveling system.
09.11 Troubleshoot and repair electrical steps.
09.12 Troubleshoot and repair electronic systems.

10.0 PERFORM METAL PROCESSING/METALLURGY SKILLS--The student will be able to:

10.01 Identify basic principles of metallurgy.
10.02 Perform stick electrode welding techniques.
10.03 Perform oxyacetylene welding techniques.
10.04 Perform MIG welding techniques.
10.05 Perform TIG welding techniques.
10.06 Perform cutting operations.
10.07 Perform sheet metal forming techniques.
10.08 Perform plastic welding and joining techniques.

11.0 TROUBLESHOOT AND REPAIR WATER SYSTEMS SERVICE--The student will be able to:

11.01 Identify RV water distribution system operations.
11.02 Troubleshoot and repair fresh water components.

11.03 Troubleshoot and repair plumbing fixtures.
11.04 Troubleshoot and repair waste water components.
11.05 Install water system.

12.0 TROUBLESHOOT AND REPAIR ELECTRICAL BRAKE SYSTEMS--The student will be able to:

12.01 Troubleshoot electrical brake systems.
12.02 Repair electrical brake systems.
12.03 Install electrical brake systems.

13.0 TROUBLESHOOT AND REPAIR TOWING SYSTEMS--The student will be able to:

13.01 Identify RV towing systems.
13.02 Install towing systems.
13.03 Install wiring systems.
13.04 Troubleshoot and repair towing systems.

14.0 TROUBLESHOOT AND REPAIR SUSPENSION SYSTEM--The student will be able to:

14.01 Identify suspension system components.
14.02 Install add-on suspension systems.
14.03 Install steer safe devices.
14.04 Troubleshoot and repair air suspension systems.
14.05 Troubleshoot and repair rubber suspension systems.

15.0 TROUBLESHOOT AND REPAIR AIR CONDITIONING SYSTEMS--The student will be able to:

15.01 Analyze basic air conditioning refrigeration systems and theory.
15.02 Test basic air condition/refrigeration systems.
15.03 Troubleshoot and repair electrical circuits and components.
15.04 Use brazing skills.
15.05 Evacuate and recharge air conditioning system.
15.06 Troubleshoot and repair refrigeration systems.
15.07 Install air conditioner.

16.0 TROUBLESHOOT AND REPAIR ABSORPTION REFRIGERATORS--The student will be able to:

16.01 Identify absorption systems theory.
16.02 Troubleshoot cooling systems.
16.03 Remove and install refrigerator cooling system.
16.04 Troubleshoot and repair electrical systems.
16.05 Troubleshoot and repair gas systems.

17.0 TROUBLESHOOT AND REPAIR HEATING SYSTEMS--The student will be able to:

17.01 Identify heating system theory.
17.02 Troubleshoot and repair gravity-type furnace.
17.03 Troubleshoot and repair pilot piezo-type furnace.
17.04 Troubleshoot and repair direct spark ignition furnace.

18.0 TROUBLESHOOT AND REPAIR WATER HEATERS--The student will be able to:

18.01 Identify water heating systems theory.
18.02 Troubleshoot and repair electrical water heaters.
18.03 Troubleshoot and repair manual pilot ignition water heaters.
18.04 Troubleshoot and repair direct spark ignition water heaters.

19.0 PERFORM CUSTOMER RELATIONS FUNCTIONS--The student will be able to:

19.01 Apply customer service communications skills.
19.02 Apply customer service techniques.

20.0 TROUBLESHOOT AND REPAIR VEHICLE INTERIOR--The student will be able to:

20.01 Repair and replace cabinets, hardware and trim.
20.02 Repair interior surface defects.
20.03 Repair floors and floor coverings.
20.04 Repair and install window coverings.
20.05 Repair and replace interior front-end group.

21.0 TROUBLESHOOT AND REPAIR VEHICLE EXTERIOR--The student will be able to:

21.01 Repair and replace metal siding and roof.
21.02 Repair and replace fiberglass surface components.
21.03 Paint and detail exterior surface.
21.04 Repair and replace canvas and screening.
21.05 Troubleshoot and repair roof lift mechanisms.
21.06 Repair and replace windows and frames.
21.07 Repair and replace hardware, doors and compartments.
21.08 Repair air and water leaks.

22.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

22.01 Conduct a job search.
22.02 Secure information about a job.
22.03 Identify documents which may be required when applying for a job interview.
22.04 Complete a job application form correctly.
22.05 Demonstrate competence in job interview techniques.
22.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
22.07 Identify acceptable work habits.
22.08 Demonstrate knowledge of how to make job changes appropriately.
22.09 Demonstrate acceptable employee health habits.
22.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

23.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

23.01 Define entrepreneurship.
23.02 Describe the importance of entrepreneurship to the American economy.
23.03 List the advantages and disadvantages of business ownership.

23.04 Identify the risks involved in ownership of a business.

23.05 Identify the necessary personal characteristics of a successful entrepreneur.

23.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Related Industrial Technology
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I469929**
CIP Number	0646.999902
Grade Level	30, 31
Length	450 hours
Certification	ANY INDUS ED G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this course is to prepare students for employment as engineering technicians (22599237), maintenance repairers, general (85132633), machinery maintenance workers (85128630), machine operators (92998902), precision woodworkers (89399747), food preparation workers (65038421), mechanics and installers (85999672), and construction workers (87899583). This program also provides supplemental training for persons previously or currently employed in these occupations.

The course content will include the following: applied general education skills (English, mathematics, physics); tools, machinery and equipment appropriate to various trade and industrial occupations; technical recording and reporting; and a variety of miscellaneous skills to provide a broad base of knowledge that supports trade or industry specific education and training in specialty areas.

The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Related Industrial industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program. These activities provide instruction in the use of tools, equipment, materials and processes found in the industry. Students are also instructed in the following: recording and reporting of data, the application of problem-solving techniques, interpretation of shop and working drawings, basic trade and industrial English and mathematics skills, the application of appropriate specifications, the preparation of data or laboratory logbooks, the application of principles of physics. Students also gain practical experience in the application of safety principles and procedures.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational

Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the cutticulum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic mathematics and English skills grade level required for this postsecondary adult vocational program is the same as the level required for the trade or industry specific program the student intends to enter. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 450 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate appropriate trade or industry related English skills.
02.0 Apply trade or industry related mathematical concepts and perform trade or industry related calculations.
03.0 Demonstrate trade or industry related applied physics skills.
04.0 Apply and use safety rules and standards.
05.0 Apply trade or industry related shop or laboratory skills.
06.0 Demonstrate knowledge and use of trade or industry related tools, machinery and equipment.
07.0 Demonstrate a basic knowledge of trade or industry related shop or working drawings.
08.0 Demonstrate the ability to operate and use appropriate trade and industry computer hardware and software.
09.0 Demonstrate proficiency in technical recording and reporting.
10.0 Demonstrate and apply knowledge of miscellaneous trade and industry related skills.
11.0 Demonstrate employability skills.
12.0 Demonstrate an understanding of entrepreneurship.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Related Trade And Industrial Technology
Secondary Number:
Postsecondary Number: I469929

01.0 DEMONSTRATE APPROPRIATE TRADE OR INDUSTRY RELATED ENGLISH SKILLS--The student will be able to:

01.01 Identify and define frequently used trade or industry related terms by sight.
01.02 Determine the main idea of trade or industry related memos and instructions.
01.03 Identify and list the order of events in a set of trade or industrial specifications/instructions.
01.04 Write a statement of how to follow a given set of written trade or industrial instructions.
01.05 Obtain appropriate trade or industry related information from reference material.
01.06 Identify sources from which to obtain trade or industry related information.
01.07 Demonstrate basic trade or industry related English writing skills.
01.08 Write a paragraph presenting trade or industry related information in chronological order.
01.09 Write a trade or industry related request for personnel, request for materials or supplies or request for information.
01.10 Write a clear, concise and sequenced series of brief statements describing the steps of a trade or industry related process or event.
01.11 Use a proper form when writing a simple trade or industry related business letter and addressing an envelope for it.
01.12 Write a trade or industry related letter of request, adjustment, complaint, application or opinion which contains necessary and accurate information.
01.13 Proofread trade or industry related reports for spelling.
01.14 Write a trade or industry related memorandum using a proper format.

02.0 APPLY TRADE OR INDUSTRY RELATED MATHEMATICAL CONCEPTS AND PERFORM APPROPRIATE TRADE OR INDUSTRY RELATED CALCULATIONS--The student will be able to:

02.01 Read and interpret measuring devices.
02.02 Add 100 addition combinations.
02.03 Add two digit numbers.
02.04 Add three-digit numbers.
02.05 Subtract 100 subtraction combinations.
02.06 Subtract two, three and four-digit numbers.
02.07 Solve one-digit divisor problems.
02.08 Solve two-digit divisor problems.
02.09 Solve three-digit divisor problems.

02.10 Solve multiplication facts.
02.11 Multiply by a one-digit factor.
02.12 Multiply by a two-digit factor.
02.13 Identify parts of a fraction.
02.14 Solve fractional word problems.
02.15 Convert fractions.
02.16 Solve decimal notations.
02.17 Solve number word problems.
02.18 Round to nearest whole number.
02.19 Add decimals.
02.20 Divide a decimal by a decimal.
02.21 Divide a whole number by a decimal.
02.22 Write fractions as decimals and percents.
02.23 Write percents as fractions and decimals.
02.24 Solve percent problems.
02.25 Compute board feet.
02.26 Compute cost of materials.
02.27 Solve basic ratio and proportion problems.
02.28 Operate simple hand-held calculators.
02.29 Convert board feet to linear feet and vice versa.
02.30 Read, interpret and apply metric conversion tables.
02.31 Solve basic algebraic problems.
02.32 Solve basic geometric problems.
02.33 Solve basic trigonometric problems.
02.34 Name the seven basic units in the International System of units (SI) and give the symbol and quantity measured for each.
02.35 Name the prefix symbol for the multiple 10 to the 18th.
02.36 Calculate a weight in pounds, given a mass in kilograms.
02.37 Identify the term angle.
02.38 Measure an angle, given a protractor.
02.39 Define the term degree.
02.40 Define the term radian.
02.41 Define the term sine of an angle.
02.42 Define the term cosine of an angle.
02.43 Define the term tangent of an angle.
02.44 Apply the Pythagorean theorem to determine the third side of a triangle when given a right triangle with two known sides.
02.45 List at least four common examples of scalar quantities.
02.46 List at least four common examples of vector quantities.
02.47 Draw a technically-acceptable graph from a table of experimental data suitable for plotting on rectangular-coordinate graph paper; the resulting graph may be linear or nonlinear.
02.48 Write a given decimal number in scientific notation.
02.49 Write a number given in scientific notation in decimal form.
02.50 Add, subtract, multiply or divide using power-of-ten numbers.
02.51 Find logarithms and antilogarithms of given numbers.
02.52 Multiply and divide numbers and solve equations using the three theorems of logarithms for products and quotients.
02.53 Measure linear dimensions with a vernier caliper.

03.0 DEMONSTRATE TRADE OR INDUSTRY RELATED APPLIED PHYSICS SKILLS--The student will be able to:

03.01 Demonstrate applied skills in mechanics.
03.02 Apply and solve vectors.
03.03 Solve force and motion problems.
03.04 Solve work, energy and power problems.
03.05 Solve friction problems.
03.06 Solve circular motion problems.
03.07 Solve rotational motion problems.
03.08 Solve problems involving the properties of solids.
03.09 Solve problems involving the properties of liquids.
03.10 Solve problems involving the properties of gases.
03.11 Demonstrate applied skills in heat, light and sound.
03.12 Solve temperature and heat problems.
03.13 Solve change-of-state problems.
03.14 Solve heat transfer problems.
03.15 Solve thermodynamic problems.
03.16 Solve refrigeration and air conditioning problems.
03.17 Solve harmonic motion problems.
03.18 Solve sound wave problems.
03.19 Solve light problems.
03.20 Solve optical problems.
03.21 Demonstrate applied skills in electricity and magnetism.
03.22 Solve electric circuit problems.
03.23 Solve electromagnetic problems.
03.24 Solve alternating current problems.
03.25 Solve generator and motor problems.
03.26 Solve electrostatic problems.
03.27 Solve magnetism problems.
03.28 Apply knowledge of strengths of materials.
03.29 Solve equilibrium problems.
03.30 Solve stress and strain problems.
03.31 Solve centroid and inertia problems.
03.32 Solve connection and joint problems.
03.33 Solve problems with beam stresses.
03.34 Solve torsion problems.
03.35 Solve compression problems.
03.36 Solve tension problems.
03.37 Solve force combination problems.

04.0 APPLY AND USE SAFETY RULES AND STANDARDS--The student will be able to:

04.01 Demonstrate knowledge and use of general safety rules.
04.02 Apply general shop or laboratory safety rules and procedures.
04.03 Demonstrate the operation of shop safety devices.
04.04 Apply fire safety rules and procedures.
04.05 Apply rules and procedures for electrical safety.
04.06 Apply safety rules and procedures applicable to stationary or moving machinery and the use and maintenance or machine safety guards.
04.07 Apply safety rules and procedures applicable to the use of moving transports (forklifts, conveyors, small electric trucks and flatbeds, etc.) and those to be followed where such transports are being operated.
04.08 Apply safety rules and procedures to be followed when operating or using hoists, cranes, elevators and other lifting equipment.

04.09 Apply safety rules and procedures to be followed when constructing or using scaffolding.

04.10 Demonstrate safety procedures to be followed in areas where heavy equipment (earth haulers, dump trucks, cranes, scrapers, bulldozers, various heavy trucks, etc.) is being operated.

04.11 Demonstrate minimal first aid skills.

04.12 Identify safety headgear and where, how and why it is to be used.

04.13 Identify safety straps and belts and where, how and why they are to be used.

04.14 Identify safety clothing (gloves, nets, aprons, goggles, soft-soled shoes or caulked boots, etc.) and where, how and why it is to be used.

04.15 Determine and demonstrate how to apply the Occupational Safety Health Administration (OSHA) regulations regarding manufacturing enclosures and machinery.

04.16 Determine and demonstrate how to apply the Occupational Safety Health Administration (OSHA) regulations regarding air and noise pollution, their control and the maximum levels allowable.

04.17 Determine and demonstrate how to apply the Occupational Safety Health Administration (OSHA) regulations regarding safeguards required when using small hand and power tools and larger machine tools.

04.18 Determine the rules applicable to the requirements for claims involving disability and unemployment insurance.

05.0 APPLY TRADE OR INDUSTRY RELATED SHOP OR LABORATORY SKILLS--The student will be able to:

05.01 Apply appropriate reading and writing skills in the writing and preparation of shop or laboratory reports or logbooks and in the technical recording and reporting of shop or laboratory data.

05.02 Apply appropriate mathematical concepts and calculations to solve given shop or laboratory projects or assignments.

05.03 Apply appropriate physics concepts and calculations in the solution of given shop or laboratory project or assignments.

05.04 Apply appropriate safety rules, regulations and procedures in a shop or laboratory setting.

05.05 Demonstrate the ability to research, locate and apply the appropriate specifications to given trade or industry related projects.

05.06 Apply knowledge of working drawings to produce usable shop or laboratory products for various trades or industries.

06.0 DEMONSTRATE KNOWLEDGE AND USE OF TRADE OR INDUSTRY RELATED TOOLS, MACHINERY, AND EQUIPMENT--The student will be able to:

06.01 Identify and explain the use of the hand tools used in the construction industries.

06.02 Demonstrate knowledge and use of the smaller power tools.

06.03 Identify and explain the use of the smaller power tools used in the construction industries.

06.04 Identify and explain the use of the larger tools and machinery used in the construction industries.
06.05 Demonstrate knowledge and use of heavy machinery and equipment.
06.06 Identify and explain the use of the heavy machinery and equipment used in the construction industries.

07.0 DEMONSTRATE A BASIC KNOWLEDGE OF TRADE AND INDUSTRY RELATED WORKING DRAWINGS--The student will be able to:

07.01 Read and interpret drafting symbols.
07.02 Read and apply appropriate information from simple trade and industry drawings.
07.03 Locate, read and apply trade and industry specifications.

08.0 DEMONSTRATE THE ABILITY TO OPERATE AND USE APPROPRIATE TRADE AND INDUSTRY COMPUTER HARDWARE AND SOFTWARE--The student will be able to:

08.01 Operate computer equipment and peripherals.
08.02 Interpret printed output.
08.03 Demonstrate post-processing file management skills.
08.04 Create computer-output microfiche (COM) files.
08.05 Create photo processing files.
08.06 Create numerical control files.

09.0 DEMONSTRATE PROFICIENCY IN TECHNICAL RECORDING AND REPORTING--The student will be able to:

09.01 Record data and design curves and graphs.
09.02 Write reports and make oral presentations.
09.03 Maintain test and trade or industry data logs.
09.04 Make equipment-failure reports.
09.05 Specify and requisition simple parts and supplies.
09.06 Compose technical letters and memoranda.
09.07 Write formal reports of laboratory experiences.
09.08 Drift preventive maintenance and calibration procedures.

10.0 DEMONSTRATE AND APPLY KNOWLEDGE OF MISCELLANEOUS TRADE AND INDUSTRY RELATED SKILLS--The student will be able to:

10.01 Demonstrate knowledge and use of scheduling techniques.
10.02 Create trade and industry related program education and review technique (PERT) charts to the scheduling of a simple hypothetical project.
10.03 Create trade and industry related critical path method (CPM) charts to the scheduling of a simple hypothetical project.
10.04 Create trade and industry related Gantt charts or lists to the scheduling of simple hypothetical project.
10.05 Demonstrate knowledge and use of electronic calculators and other general work-support tools.
10.06 Demonstrate knowledge and use of trade and industry related reference materials.
10.07 Demonstrate the ability to read and interpret appropriate trade and industrial blueprints.

10.08 Demonstrate knowledge and ability in trade and industry related problem-solving.

10.09 Demonstrate knowledge and use of trade or industry terms and terminology.

11.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

11.01 Conduct a job search.

11.02 Secure information about a job.

11.03 Identify documents that may be required when applying for a job.

11.04 Complete a job application form correctly.

11.05 Demonstrate competence in job interview techniques.

11.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.

11.07 Identify acceptable work habits.

11.08 Demonstrate knowledge of how to make appropriate job changes.

11.09 Demonstrate acceptable employee health habits.

11.10 Demonstrate knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

12.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

12.01 Define entrepreneurship.

12.02 Describe the importance of entrepreneurship to the American economy.

12.03 List the advantages and disadvantages of business ownership.

12.04 Identify the risks involved in ownership of a business.

12.05 Identify the necessary personal characteristics of a successful entrepreneur.

12.06 Identify the business skills needed to operate a small business efficiently and effectively.

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July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Residential Appliance and Refrigeration Repair
Occupational Area: Industrial Education

	Secondary	PSAV
Program Numbers	**8706000**	**I470106**
CIP Number	0647.010601	0647.010601
Grade Level	9-12, 30, 31	30, 31
Length	6 credits	900 hours
Certification	APPLI REPR @7 G GAS FITTER @7 G	APPLI REPR @7 G GAS FITTER @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as electric home appliance technicians (85711656), electrical appliance servicers (827.261-010), or appliance service representatives (827.261-010), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, electrical and refrigeration skills, analyzing, diagnosing and repairing washers, dryers, dishwashers, trash compactors, ranges, refrigerators, freezers, microwave ovens, and window air conditioners.

Listed below are the courses that comprise this program when offered at the secondary level:

8706010 - Residential Appliance and Refrigeration Repair 1
8706020 - Residential Appliance and Refrigeration Repair 2
8706030 - Residential Appliance and Refrigeration Repair 3
8706040 - Residential Appliance and Refrigeration Repair 4
8706050 - Residential Appliance and Refrigeration Repair 5
8706060 - Residential Appliance and Refrigeration Repair 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Residential Appliance & Refrigeration industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in fundamentals of electricity and refrigeration, identifying, analyzing, and diagnosing gas and electric appliance system problems, disassembling and reassembling appliances, and servicing appliances.

III. **SPECIAL NOTE**: The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 8.0, Language 8.0, Reading 8.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 900 hours.

The particular outcomes and student performance standards which the handicapped student must master to earn credit must be specified in the student's Individual Educational Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with the requirements indicated in subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Apply proper laboratory practices.
02.0 Apply electrical fundamentals.
03.0 Install, troubleshoot, and repair electric ranges.
04.0 Install, troubleshoot, and repair gas ranges.
05.0 Install, troubleshoot, and repair electric clothes dryers.
06.0 Install, troubleshoot, and repair gas clothes dryers.
07.0 Install, troubleshoot, and repair clothes washers.
08.0 Install, troubleshoot, and repair dishwashers.

09.0 Utilize fundamentals of refrigeration.
10.0 Work with tubing and fittings.
11.0 Demonstrate appropriate communication skills.
12.0 Demonstrate appropriate math skills.
13.0 Demonstrate appropriate understanding of basic science.
14.0 Demonstrate employability skills.
15.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Residential Appliance and Refrigeration Repair
Secondary Number: 8706000
Postsecondary Number: I470106

01.0 APPLY PROPER LABORATORY PRACTICES--The student will be able to:

- 01.01 Use industry accepted safety practices.
- 01.02 Explain appropriate first aid for electrical shock and potential shop accidents.
- 01.03 Perform appropriate recordkeeping functions.
- 01.04 Explain and demonstrate the proper use and care of hand tools.
- 01.05 Explain and demonstrate the proper use and care of meters and test equipment.
- 01.06 Explain and demonstrate the proper use and care of power tools.

02.0 APPLY ELECTRICAL FUNDAMENTALS--The student will be able to:

- 02.01 Explain electron theory.
- 02.02 Identify circuits from schematics and diagrams using commonly accepted symbols.
- 02.03 Explain Ohm's Law.
- 02.04 Measure resistance.
- 02.05 Measure voltage.
- 02.06 Measure amperage.
- 02.07 Measure wattage.
- 02.08 Explain and construct series circuits.
- 02.09 Explain and construct parallel circuits.
- 02.10 Explain and construct combination circuits.
- 02.11 Explain inductance and magnetism and their relationship to electric motors.
- 02.12 Describe how electric motors function.
- 02.13 Explain the function of capacitors and how to troubleshoot them.
- 02.14 Relays and switches.
- 02.15 Explain the function of capacitors and transformers in major appliances.
- 02.16 Explain the concept and rationale of motor protection.
- 02.17 Describe how a compressor functions.

03.0 INSTALL, TROUBLESHOOT, AND REPAIR ELECTRIC RANGES--The student will be able to:

- 03.01 Install an electric range.
- 03.02 Describe the operation and application of components.
- 03.03 Read and interpret schematics and diagrams.
- 03.04 Troubleshoot clocks/timers.
- 03.05 Remove and replace clocks/timers.
- 03.06 Troubleshoot surface unit switches and components.
- 03.07 Remove and replace surface switches or components.
- 03.08 Troubleshoot oven thermostats and components.

03.09 Remove and replace oven thermostats or components.
03.10 Troubleshoot oven selector switches and components.
03.11 Remove and replace oven selector switches or components.
03.12 Troubleshoot surface units and components.
03.13 Remove and replace surface units or components.
03.14 Troubleshoot bake and broil elements.
03.15 Remove and replace bake and broil elements.
03.16 Troubleshoot mullion heaters.
03.17 Remove and replace mullion heater.
03.18 Troubleshoot time delay relays.
03.19 Remove and replace time delay relay.
03.20 Troubleshoot oven sensors and components.
03.21 Remove and replace oven sensor or component.
03.22 Troubleshoot door locks or components.
03.23 Remove and replace door lock or component.
03.24 Troubleshoot fans.
03.25 Remove and replace fan.
03.26 Troubleshoot gaskets and seals.
03.27 Remove and replace gasket or seal.
03.28 Perform operational check.
03.29 Instruct consumer on use and care.

04.0 INSTALL, TROUBLESHOOT, AND REPAIR GAS RANGES--The student will be able to:

04.01 Install a gas range.
04.02 Identify components and their function.
04.03 Read and interpret schematics and diagrams.
04.04 Troubleshoot clocks/timers.
04.05 Remove and replace clocks/timers.
04.06 Troubleshoot oven thermostats.
04.07 Remove and replace oven thermostats.
04.08 Troubleshoot oven selector switches.
04.09 Remove and replace oven selector switches.
04.10 Troubleshoot self-clean relays.
04.11 Remove and replace self-clean relays.
04.12 Troubleshoot oven sensors.
04.13 Remove and replace oven sensor.
04.14 Troubleshoot door locks.
04.15 Remove and replace door lock.
04.16 Troubleshoot fans.
04.17 Remove and replace fan.
04.18 Troubleshoot gas valves for surface burners.
04.19 Remove and replace gas valve for surface burner.
04.20 Troubleshoot gas valve for oven.
04.21 Remove and replace gas valve for oven.
04.22 Troubleshoot electric igniters.
04.23 Remove and replace electric igniter.
04.24 Troubleshoot safety valves.
04.25 Remove and replace safety valve.
04.26 Troubleshoot pressure regulators.
04.27 Remove and replace pressure regulator.
04.28 Troubleshoot door seals/gaskets.
04.29 Remove and replace door seal/gasket.

04.30 Perform operational check.
04.31 Instruct consumer on use and care.

05.0 INSTALL, TROUBLESHOOT, AND REPAIR ELECTRIC CLOTHES DRYER--The student will be able to:

05.01 Install an electric dryer.
05.02 Identify components and their function components.
05.03 Troubleshoot timers and components.
05.04 Remove and replace timer or component.
05.05 Troubleshoot drive motors and components.
05.06 Remove and replace drive motor or component.
05.07 Troubleshoot heating elements and components.
05.08 Remove and replace element or component.
05.09 Troubleshoot bearings and components.
05.10 Remove and replace bearing or component.
05.11 Troubleshoot belts and pulleys.
05.12 Remove and replace belt or pulley.
05.13 Troubleshoot rollers and glides.
05.14 Remove and replace roller or glides.
05.15 Troubleshoot filters.
05.16 Remove and replace filter.
05.17 Troubleshoot seals.
05.18 Remove and replace seals.
05.19 Troubleshoot push-to-start switch.
05.20 Remove and replace push-to-start switch.
05.21 Troubleshoot door switches.
05.22 Remove and replace door switch.
05.23 Troubleshoot selector switches.
05.24 Remove and replace selector switch.
05.25 Perform operational check.
05.25 Instruct consumer on use and care.

06.0 INSTALL, TROUBLESHOOT AND REPAIR GAS CLOTHES DRYERS--The student will be able to:

06.01 Install a gas dryer.
06.02 Identify components and their function.
06.03 Read and interpret schematics and diagrams.
06.04 Troubleshoot electric ignition components.
06.05 Remove and replace electric ignition components.
06.06 Troubleshoot timers and components.
06.07 Remove and replace timer or component.
06.08 Troubleshoot drive motors.
06.09 Remove and replace drive motor.
06.10 Troubleshoot gas burner.
06.11 Remove and replace gas burner.
06.12 Troubleshoot thermostats.
06.13 Remove and replace thermostat.
06.14 Troubleshoot gas valves.
06.15 Remove and replace gas valve.
06.16 Troubleshoot thermocouples.
06.17 Remove and replace thermocouple.
06.18 Troubleshoot flame switch.

06.19 Remove and replace flame switch.
06.20 Troubleshoot bearing assemblies and components.
06.21 Remove and replace bearing or component.
06.22 Troubleshoot belts and pulleys.
06.23 Remove and replace belt or pulley.
06.24 Troubleshoot rollers and glides.
06.25 Remove and replace roller or glide.
06.26 Troubleshoot seals.
06.27 Remove and replace seals.
06.28 Troubleshoot door switches.
06.29 Remove and replace door switch.
06.30 Troubleshoot selector switches.
06.31 Remove and replace selector switch.
06.32 Troubleshoot motor switches.
06.33 Remove and replace motor switch.
06.34 Perform operational check.
06.35 Instruct consumer on use and care.

07.0 INSTALL, TROUBLESHOOT AND REPAIR CLOTHES WASHERS--The student will be able to:

07.01 Install a clothes washer.
07.02 Identify components and their function.
07.03 Read and interpret schematics and diagrams.
07.04 Troubleshoot timers and components.
07.05 Remove and replace timer or component.
07.06 Troubleshoot selector switches.
07.07 Remove and replace selector switch.
07.08 Troubleshoot water level switches and components.
07.09 Remove and replace water level switch or component.
07.10 Troubleshoot water inlet valves and components.
07.11 Remove and replace water inlet valve or component.
07.12 Troubleshoot hoses.
07.13 Remove and replace hoses.
07.14 Troubleshoot water pumps and components.
07.15 Remove and replace water pump or component.
07.16 Troubleshoot filters.
07.17 Remove and replace filter.
07.18 Troubleshoot drive motors and components.
07.19 Remove and replace drive motor or component.
07.20 Troubleshoot belts and pulleys.
07.21 Remove and replace belt or pulley.
07.22 Troubleshoot transmissions and components.
07.23 Remove and replace transmission or component.
07.24 Troubleshoot bearings.
07.25 Remove and replace bearings.
07.26 Troubleshoot water and oil seals.
07.27 Remove and replace water and oil seals.
07.28 Troubleshoot clutches.
07.29 Remove and replace clutch.
07.30 Troubleshoot brakes.
07.31 Remove and replace brake.
07.32 Troubleshoot lid switches and components.
07.33 Remove and replace lid switch or component.

07.34 Perform operational check.
07.35 Instruct consumer on use and care.

08.0 INSTALL, TROUBLESHOOT, AND REPAIR DISHWASHERS--The student will be able to:

08.01 Install a dishwasher.
08.02 Identify components and their function.
08.03 Read and interpret schematics and diagrams.
08.04 Troubleshoot timers and components.
08.05 Remove and replace timer or component.
08.06 Troubleshoot selector switches.
08.07 Remove and replace selector switch.
08.08 Troubleshoot float switches.
08.09 Remove and replace float switch.
08.10 Troubleshoot door switches.
08.11 Remove and replace door switch.
08.12 Troubleshoot motors and components.
08.13 Remove and replace motor and component.
08.14 Troubleshoot heating elements.
08.15 Remove and replace heating element.
08.16 Troubleshoot relays.
08.17 Remove and replace relay.
08.18 Troubleshoot water valves and components.
08.19 Remove and replace water valve or component.
08.20 Troubleshoot hoses.
08.21 Remove and replace hoses.
08.22 Troubleshoot pumps and components.
08.23 Remove and replace pump or component.
08.24 Troubleshoot seals.
08.25 Remove and replace seals.
08.26 Troubleshoot dispensers and components.
08.27 Remove and replace dispenser or component.
08.28 Troubleshoot spray arms.
08.29 Remove and replace spray arm.
08.30 Troubleshoot blower motors.
08.31 Remove and replace blower motor.
08.32 Troubleshoot thermostats.
08.33 Remove and replace thermostat.
08.34 Perform operational check.
08.35 Instruct consumer on use and care.

09.0 UTILIZE THE FUNDAMENTALS OF REFRIGERATION--The student will be able to:

09.01 Explain commonly used terms.
09.02 Perform heat transfer, measuring and temperature conversions.
09.03 Perform pressure measuring and conversion calculations.
09.04 Explain the concept of state of matter.
09.05 Explain the differences in refrigerants and their uses.
09.06 Diagram and explain the functions of the components of basic refrigeration systems.
09.07 Remove, repair and replace compressors.
09.08 Remove, replace and service condensers, evaporators and driers.

09.09 Use metering devices to determine operating condition of a refrigeration system.
09.10 Troubleshoot and repair defective refrigeration systems.

10.0 WORK WITH TUBING AND FITTINGS--The student will be able to:

10.01 Identify types and sizes of tubing and fittings.
10.02 Measure, cut, flare, swage and bend tubing.
10.03 Soft solder with acetylene.
10.04 Braze with acetylene and oxyacetylene.
10.05 Fabricate replacement sections of tubing for appliances.

11.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

11.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
11.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
11.03 Read and follow written and oral instructions.
11.04 Answer and ask questions coherently and concisely.
11.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
11.06 Demonstrate appropriate telephone/communication skills.

12.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

12.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
12.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
12.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
12.05 Demonstrate an understanding of federal, state and local taxes and their computation.

13.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

13.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
13.02 Draw conclusions or make inferences from data.
13.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
13.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

14.01 Conduct a job search.

14.02 Secure information about a job.
14.03 Identify documents which may be required when applying for a job interview.
14.04 Complete a job application form correctly.
14.05 Demonstrate competence in job interview techniques.
14.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
14.07 Identify acceptable work habits.
14.08 Demonstrate knowledge of how to make job changes appropriately.
14.09 Demonstrate acceptable employee health habits.
14.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

15.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

15.01 Define entrepreneurship.
15.02 Describe the importance of entrepreneurship to the American economy.
15.03 List the advantages and disadvantages of business ownership.
15.04 Identify the risks involved in ownership of a business.
15.05 Identify the necessary personal characteristics of a successful entrepreneur.
15.06 Identify the business skills needed to operate a small business efficiently and effectively.

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July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8706010
Course Title: Residential Appliance and Refrigeration Repair 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to present safety and first aid for the lab environment. Also the identification, use and care of hand and power tools will be presented. Brazing and soldering techniques, as well as working with tubing, will be presented.

01.0 APPLY PROPER LABORATORY PRACTICES--The student will be able to:

- 01.01 Use industry accepted safety practices.
- 01.02 Explain appropriate first aid for electrical shock and potential shop accidents.
- 01.03 Perform appropriate recordkeeping functions.
- 01.04 Explain and demonstrate the proper use and care of hand tools.
- 01.05 Explain and demonstrate the proper use and care of meters and test equipment.
- 01.06 Explain and demonstrate the proper use and care of power tools.

10.0 WORK WITH TUBING AND FITTINGS--The student will be able to:

- 10.01 Identify types and sizes of tubing and fittings.
- 10.02 Measure, cut, flare, swage and bend tubing.
- 10.03 Soft solder with acetylene.
- 10.04 Braze with acetylene and oxyacetylene.
- 10.05 Fabricate replacement sections of tubing for appliances.

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July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8706020
Course Title: Residential Appliance and Refrigeration Repair 2
Course Credit: 1

COURSE DESCRIPTION:

This course will teach basic concepts of electricity and electrical circuits, their component parts, and theory of operation including Ohm's law. Basic concepts of transformers, electric motors and capacitors will be presented.

02.0 APPLY ELECTRICAL FUNDAMENTALS--The student will be able to:

- 02.01 Explain electron theory.
- 02.02 Identify circuits from schematics and diagrams using commonly accepted symbols.
- 02.03 Explain Ohm's Law.
- 02.04 Measure resistance.
- 02.05 Measure voltage.
- 02.06 Measure amperage.
- 02.07 Measure wattage.
- 02.08 Explain and construct series circuits.
- 02.09 Explain and construct parallel circuits.
- 02.10 Explain and construct combination circuits.
- 02.11 Explain inductance and magnetism and their relationship to electric motors.
- 02.12 Describe how electric motors function.
- 02.13 Explain the function of capacitors and how to troubleshoot them.
- 02.14 Relays and switches.
- 02.15 Explain the function of capacitors and transformers in major appliances.
- 02.16 Explain the concept and rationale of motor protection.
- 02.17 Describe how a compressor functions.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8706030
Course Title: Residential Appliance and Refrigeration Repair 3
Course Credit: 1

COURSE DESCRIPTION:

This course teaches the skills necessary to install, troubleshoot and repair, electric ranges and clothes dryers. Techniques to instruct the consumer on the proper operation of these appliances will be presented.

03.0 INSTALL, TROUBLESHOOT, AND REPAIR ELECTRIC RANGES--The student will be able to:

03.01 Install an electric range.
03.02 Describe the operation and application of components.
03.03 Read and interpret schematics and diagrams.
03.04 Troubleshoot clocks/timers.
03.05 Remove and replace clocks/timers.
03.06 Troubleshoot surface unit switches and components.
03.07 Remove and replace surface switches or components.
03.08 Troubleshoot oven thermostats and components.
03.09 Remove and replace oven thermostats or components.
03.10 Troubleshoot oven selector switches and components.
03.11 Remove and replace oven selector switches or components.
03.12 Troubleshoot surface units and components.
03.13 Remove and replace surface units or components.
03.14 Troubleshoot bake and broil elements.
03.15 Remove and replace bake and broil elements.
03.16 Troubleshoot mullion heaters.
03.17 Remove and replace mullion heater.
03.18 Troubleshoot time delay relays.
03.19 Remove and replace time delay relay.
03.20 Troubleshoot oven sensors and components.
03.21 Remove and replace oven sensor or component.
03.22 Troubleshoot door locks or components.
03.23 Remove and replace door lock or component.
03.24 Troubleshoot fans.
03.25 Remove and replace fan.
03.26 Troubleshoot gaskets and seals.
03.27 Remove and replace gasket or seal.
03.28 Perform operational check.
03.29 Instruct consumer on use and care.

05.0 INSTALL, TROUBLESHOOT, AND REPAIR ELECTRIC CLOTHES DRYER--The student will be able to:

05.01 Install an electric dryer.
05.02 Identify components and their function components.
05.03 Troubleshoot timers and components.

05.04 Remove and replace timer or component.
05.05 Troubleshoot drive motors and components.
05.06 Remove and replace drive motor or component.
05.07 Troubleshoot heating elements and components.
05.08 Remove and replace element or component.
05.09 Troubleshoot bearings and components.
05.10 Remove and replace bearing or component.
05.11 Troubleshoot belts and pulleys.
05.12 Remove and replace belt or pulley.
05.13 Troubleshoot rollers and glides.
05.14 Remove and replace roller or glides.
05.15 Troubleshoot filters.
05.16 Remove and replace filter.
05.17 Troubleshoot seals.
05.18 Remove and replace seals.
05.19 Troubleshoot push-to-start switch.
05.20 Remove and replace push-to-start switch.
05.21 Troubleshoot door switches.
05.22 Remove and replace door switch.
05.23 Troubleshoot selector switches.
05.24 Remove and replace selector switch.
05.25 Perform operational check.
05.26 Instruct consumer on use and care.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8706040
Course Title: Residential Appliance and Refrigeration Repair 4
Course Credit: 1

COURSE DESCRIPTION:

This course will include the hands-on performance of installation, troubleshooting and repair of residential clothes washers, refrigerators and dishwashers.

07.0 INSTALL, TROUBLESHOOT AND REPAIR CLOTHES WASHERS--The student will be able to:

07.01 Install a clothes washer.
07.02 Identify components and their function.
07.03 Read and interpret schematics and diagrams.
07.04 Troubleshoot timers and components.
07.05 Remove and replace timer or component.
07.06 Troubleshoot selector switches.
07.07 Remove and replace selector switch.
07.08 Troubleshoot water level switches and components.
07.09 Remove and replace water level switch or component.
07.10 Troubleshoot water inlet valves and components.
07.11 Remove and replace water inlet valve or component.
07.12 Troubleshoot hoses.
07.13 Remove and replace hoses.
07.14 Troubleshoot water pumps and components.
07.15 Remove and replace water pump or component.
07.16 Troubleshoot filters.
07.17 Remove and replace filter.
07.18 Troubleshoot drive motors and components.
07.19 Remove and replace drive motor or component.
07.20 Troubleshoot belts and pulleys.
07.21 Remove and replace belt or pulley.
07.22 Troubleshoot transmissions and components.
07.23 Remove and replace transmission or component.
07.24 Troubleshoot bearings.
07.25 Remove and replace bearings.
07.26 Troubleshoot water and oil seals.
07.27 Remove and replace water and oil seals.
07.28 Troubleshoot clutches.
07.29 Remove and replace clutch.
07.30 Troubleshoot brakes.
07.31 Remove and replace brake.
07.32 Troubleshoot lid switches and components.
07.33 Remove and replace lid switch or component.
07.34 Perform operational check.
07.35 Instruct consumer on use and care.

08.0 INSTALL, TROUBLESHOOT, AND REPAIR DISHWASHERS--The student will be able to:

08.01 Install a dishwasher.
08.02 Identify components and their function.
08.03 Read and interpret schematics and diagrams.
08.04 Troubleshoot timers and components.
08.05 Remove and replace timer or component.
08.06 Troubleshoot selector switches.
08.07 Remove and replace selector switch.
08.08 Troubleshoot float switches.
08.09 Remove and replace float switch.
08.10 Troubleshoot door switches.
08.11 Remove and replace door switch.
08.12 Troubleshoot motors and components.
08.13 Remove and replace motor and component.
08.14 Troubleshoot heating elements.
08.15 Remove and replace heating element.
08.16 Troubleshoot relays.
08.17 Remove and replace relay.
08.18 Troubleshoot water valves and components.
08.19 Remove and replace water valve or component.
08.20 Troubleshoot hoses.
08.21 Remove and replace hoses.
08.22 Troubleshoot pumps and components.
08.23 Remove and replace pump or component.
08.24 Troubleshoot seals.
08.25 Remove and replace seals.
08.26 Troubleshoot dispensers and components.
08.27 Remove and replace dispenser or component.
08.28 Troubleshoot spray arms.
08.29 Remove and replace spray arm.
08.30 Troubleshoot blower motors.
08.31 Remove and replace blower motor.
08.32 Troubleshoot thermostats.
08.33 Remove and replace thermostat.
08.34 Perform operational check.
08.35 Instruct consumer on use and care.

09.0 UTILIZE THE FUNDAMENTALS OF REFRIGERATION--The student will be able to:

09.01 Explain commonly used terms.
09.02 Perform heat transfer, measuring and temperature conversions.
09.03 Perform pressure measuring and conversion calculations.
09.04 Explain the concept of state of matter.
09.05 Explain the differences in refrigerants and their uses.
09.06 Diagram and explain the functions of the components of basic refrigeration systems.
09.07 Remove, repair and replace compressors.
09.08 Remove, replace and service condensers, evaporators and driers.
09.09 Use metering devices to determine operating condition of a refrigeration system.
09.10 Troubleshoot and repair defective refrigeration systems.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8706050
Course Title: Residential Appliance and Refrigeration Repair 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed for component identification, troubleshooting and repair of residential gas ranges and clothes dryers.

04.0 INSTALL, TROUBLESHOOT, AND REPAIR GAS RANGES--The student will be able to:

04.01 Install a gas range.
04.02 Identify components and their function.
04.03 Read and interpret schematics and diagrams.
04.04 Troubleshoot clocks/timers.
04.05 Remove and replace clocks/timers.
04.06 Troubleshoot oven thermostats.
04.07 Remove and replace oven thermostats.
04.08 Troubleshoot oven selector switches.
04.09 Remove and replace oven selector switches.
04.10 Troubleshoot self-clean relays.
04.11 Remove and replace self-clean relays.
04.12 Troubleshoot oven sensors.
04.13 Remove and replace oven sensor.
04.14 Troubleshoot door locks.
04.15 Remove and replace door lock.
04.16 Troubleshoot fans.
04.17 Remove and replace fan.
04.18 Troubleshoot gas valves for surface burners.
04.19 Remove and replace gas valve for surface burner.
04.20 Troubleshoot gas valve for oven.
04.21 Remove and replace gas valve for oven.
04.22 Troubleshoot electric igniters.
04.23 Remove and replace electric igniter.
04.24 Troubleshoot safety valves.
04.25 Remove and replace safety valve.
04.26 Troubleshoot pressure regulators.
04.27 Remove and replace pressure regulator.
04.28 Troubleshoot door seals/gaskets.
04.29 Remove and replace door seal/gasket.
04.30 Perform operational check.
04.31 Instruct consumer on use and care.

06.0 INSTALL, TROUBLESHOOT AND REPAIR GAS CLOTHES DRYERS--The student will be able to:

06.01 Install a gas dryer.
06.02 Identify components and their function.

06.03 Read and interpret schematics and diagrams.
06.04 Troubleshoot electric ignition components.
06.05 Remove and replace electric ignition components.
06.06 Troubleshoot timers and components.
06.07 Remove and replace timer or component.
06.08 Troubleshoot drive motors.
06.09 Remove and replace drive motor.
06.10 Troubleshoot gas burner.
06.11 Remove and replace gas burner.
06.12 Troubleshoot thermostats.
06.13 Remove and replace thermostat.
06.14 Troubleshoot gas valves.
06.15 Remove and replace gas valve.
06.16 Troubleshoot thermocouples.
06.17 Remove and replace thermocouple.
06.18 Troubleshoot flame switch.
06.19 Remove and replace flame switch.
06.20 Troubleshoot bearing assemblies and components.
06.21 Remove and replace bearing or component.
06.22 Troubleshoot belts and pulleys.
06.23 Remove and replace belt or pulley.
06.24 Troubleshoot rollers and glides.
06.25 Remove and replace roller or glide.
06.26 Troubleshoot seals.
06.27 Remove and replace seals.
06.28 Troubleshoot door switches.
06.29 Remove and replace door switch.
06.30 Troubleshoot selector switches.
06.31 Remove and replace selector switch.
06.32 Troubleshoot motor switches.
06.33 Remove and replace motor switch.
06.34 Perform operational check.
06.35 Instruct consumer on use and care.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8706060
Course Title: Residential Appliance and Refrigeration Repair 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to instruct the student in the preparation of job applications and resumes. Also to enhance the student in additional lab activities as selected by the instructor.

11.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 11.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 11.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 11.03 Read and follow written and oral instructions.
- 11.04 Answer and ask questions coherently and concisely.
- 11.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 11.06 Demonstrate appropriate telephone/communication skills.

12.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 12.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 12.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 12.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 12.05 Demonstrate an understanding of federal, state and local taxes and their computation.

13.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 13.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 13.02 Draw conclusions or make inferences from data.
- 13.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 13.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

14.01 Conduct a job search.
14.02 Secure information about a job.
14.03 Identify documents which may be required when applying for a job interview.
14.04 Complete a job application form correctly.
14.05 Demonstrate competence in job interview techniques.
14.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
14.07 Identify acceptable work habits.
14.08 Demonstrate knowledge of how to make job changes appropriately.
14.09 Demonstrate acceptable employee health habits.
14.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

15.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

15.01 Define entrepreneurship.
15.02 Describe the importance of entrepreneurship to the American economy.
15.03 List the advantages and disadvantages of business ownership.
15.04 Identify the risks involved in ownership of a business.
15.05 Identify the necessary personal characteristics of a successful entrepreneur.
15.06 Identify the business skills needed to operate a small business efficiently and effectively.

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July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Roofing
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I460410**
CIP Number	0646.041000
Grade Level	30, 31
Length	450 hours
Certification	TEC CONSTR ¶7 ¶G
	ROOFING @7 G
	BLDG CONST ¶7 ¶G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as roofers (87808570), or to provide supplemental training for persons previously or currently employed in this occupation.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, ladders and scaffolds, waterproofing, and installation of all types of residential and commercial roofing.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Roofing industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in safe use of tools and equipment including ladders and scaffolds, and the installation of shingle, built-up, single ply, and clay tile roofing.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 7.0, Language 7.0, Reading 7.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 450 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Read and interpret blueprints and schematics.
02.0 Demonstrate use and care of hand tools and equipment.
03.0 Develop work estimates.
04.0 Identify types of roofing decks.
05.0 Install shingle roofs.
06.0 Install build-up roofing.
07.0 Install single-ply roofing.
08.0 Install clay tile roofing.
09.0 Demonstrate safe work habits.
10.0 Demonstrate appropriate communication skills.
11.0 Demonstrate appropriate math skills.
12.0 Demonstrate appropriate understanding of basic science.
13.0 Demonstrate employability skills.
14.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Roofing
Secondary Number:
Postsecondary Number: I460410

01.0 READ AND INTERPRET BLUEPRINTS AND SCHEMATICS--The student will be able to:

- 01.01 Read and interpret the individual scales of the architect scale.
- 01.02 Read and interpret the individual scales of the engineers scale.
- 01.03 Identify and interpret architectural drawings.
- 01.04 Identify and read lines in the alphabet of lines.
- 01.05 Demonstrate knowledge and proficiency of commonly used symbols and abbreviations.
- 01.06 Read and interpret basic dimensions of linear, angular and circular types.
- 01.07 Determine area from given dimensions.
- 01.08 Demonstrate knowledge and proficiency of tolerance dimensions.
- 01.09 Convert blueprint dimensions to actual distance.
- 01.10 Define/identify the various blueprint/schematic terms.

02.0 DEMONSTRATE USE AND CARE OF HAND TOOLS AND EQUIPMENT--The student will be able to:

- 02.01 Identify basic hand tools.
- 02.02 Identify basic rules concerning safe use and care of tools and equipment.
- 02.03 Select correct tools for the selected skills.
- 02.04 Demonstrate the safe and correct use of each item of tools and equipment.
- 02.05 Select and demonstrate proper use of the types of ladders.
- 02.06 Demonstrate proper procedures in erecting a scaffold.

03.0 DEVELOP WORK ESTIMATES--The student will be able to:

- 03.01 Solve material and cost estimating problems.
- 03.02 Estimate time and wage costs to complete a specified job.
- 03.03 Develop cost comparison of performing versus contracting.
- 03.04 Determine materials and supplies according to blueprints.
- 03.05 Convert required materials and supplies to appropriate measure - square feet, squares, board feet, etc.
- 03.06 Prepare an order for materials and supplies.

04.0 IDENTIFY TYPES OF ROOFING DECKS--The student will be able to:

- 04.01 Identify purposes of a roof.
- 04.02 Identify roofing members.
- 04.03 Describe the seven roofing styles.
- 04.04 Lay out and demonstrate models of roof styles.

05.0 INSTALL SHINGLE ROOFS--The student will be able to:

05.01 Identify and select the most commonly used shingles.
05.02 Demonstrate cutting of roofing paper.
05.03 Demonstrate application of roofing paper.
05.04 Demonstrate use of nails and staples in attaching roof paper.
05.05 Demonstrate attachment of wood shingles.
05.06 Demonstrate use of punch for hole punching wood shingles.
05.07 Demonstrate attachment of fiberglass shingles.
05.08 Demonstrate attachment of asphalt shingles.
05.09 Select, prepare and install flashing materials.
05.10 Select and demonstrate use of fasteners for each shingle type.
05.11 Describe roofing paper and its uses.
05.12 Locate and repair leaks.

06.0 INSTALL BUILD-UP ROOFING--The student will be able to:

06.01 Describe characteristics of "build-up" roofs.
06.02 Identify, select and describe materials for "build-up" roof.
06.03 Demonstrate application of tar or asphalt to roof base.
06.04 Demonstrate step-by-step procedure for installation.
06.05 Select and prepare flashing materials including gravel stop fascia.
06.06 Select and demonstrate use of fasteners.
06.07 Demonstrate construction and attachment of pre-fabricated roof sections.
06.08 Locate and repair leaks.

07.0 INSTALL SINGLE-PLY ROOFING--The student will be able to:

07.01 Describe and apply criteria for single-ply roofs.
07.02 Demonstrate cutting of roofing paper.
07.03 Demonstrate installation of roofing paper.
07.04 Demonstrate use of nails and staples in attaching roofing paper.
07.05 Select and prepare flashing materials for installation.
07.06 Demonstrate installation of roofing materials with appropriate fasteners.
07.07 Describe roofing paper and its uses.
07.08 Locate and repair leaks.

08.0 INSTALL CLAY TILE ROOFING--The student will be able to:

08.01 Describe and apply criteria for using clay tile.
08.02 Demonstrate cutting of roofing paper.
08.03 Demonstrate installation of roofing paper.
08.04 Demonstrate use of nails and staples in attaching roofing paper.
08.05 Select and prepare flashing materials for installation.
08.06 Demonstrate use of punch in preparing holes for attaching tile roofing.
08.07 Locate and repair leaks.

09.0 DEMONSTRATE SAFE WORK HABITS--The student will be able to:

09.01 Describe requirements and use of portable and fixed access to upper level worksite.
09.02 Identify kinds of scaffolding procedures and requirements.
09.03 Identify housekeeping and general safety hazards while performing at elevated levels.
09.04 Identify requirements of medical and first aid services.
09.05 Demonstrate basic first aid procedures.
09.06 List and describe uses of personal protection devices and activities.
09.07 Identify and describe the classes and types of fires.
09.08 Identify and describe the types of fire extinguishers.
09.09 Operate a fire extinguisher.

10.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

10.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
10.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
10.03 Read and follow written and oral instructions.
10.04 Answer and ask questions coherently and concisely.
10.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
10.06 Demonstrate appropriate telephone/communication skills.

11.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

11.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
11.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
11.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
11.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
11.05 Demonstrate an understanding of federal, state and local taxes and their computation.

12.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

12.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
12.02 Draw conclusions or make inferences from data.
12.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
12.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

13.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

13.01 Conduct a job search.
13.02 Secure information about a job.
13.03 Identify documents which may be required when applying for a job interview.
13.04 Complete a job application form correctly.
13.05 Demonstrate competence in job interview techniques.
13.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
13.07 Identify acceptable work habits.
13.08 Demonstrate knowledge of how to make job changes appropriately.
13.09 Demonstrate acceptable employee health habits.
13.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

14.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

14.01 Define entrepreneurship.
14.02 Describe the importance of entrepreneurship to the American economy.
14.03 List the advantages and disadvantages of business ownership.
14.04 Identify the risks involved in ownership of a business.
14.05 Identify the necessary personal characteristics of a successful entrepreneur.
14.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Safety Engineering Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.070101
Grade Level	College Credits
Length	AS Degree/64

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as safety inspector (168.264-014), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and skills to technically assist in analyzing working conditions and providing technical assistance in the maintenance of materials, equipment, and fire safety systems.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Safety Engineering industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in analyzing work place conditions determining potentially unsafe work place conditions, correcting unsafe conditions and safety engineering techniques.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum

content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Read and interpret blueprints and schematics.
02.0 Develop drawings or sketches of safety devices or plant layouts.
03.0 Demonstrate understanding of safety engineering techniques.
04.0 Analyze workplace environmental elements.
05.0 Demonstrate understanding of methods for correcting or preventing unsafe conditions.
06.0 Perform cost analyses of corrective measures.
07.0 Interpret related legislation.
08.0 Read, interpret, and write technical reports.
09.0 Develop safety training programs for hazardous work environments.
10.0 Demonstrate appropriate communication skills.
11.0 Demonstrate appropriate math skills.
12.0 Demonstrate appropriate understanding of basic science.
13.0 Demonstrate employability skills.
14.0 Demonstrate an understanding of entrepreneurship.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Safety Engineering Technology
Secondary Number:
Postsecondary Number: 0615.070101

01.0 READ AND INTERPRET BLUEPRINTS AND SCHEMATICS--The student will be able to:

- 01.01 Identify commonly used symbols and lines.
- 01.02 Read architect's scale and engineer's scale.
- 01.03 Identify mechanical symbols.
- 01.04 Read and interpret blueprints and specifications.

02.0 DEVELOP DRAWINGS OR SKETCHES OF SAFETY DEVICES OR PLANT LAYOUTS--The student will be able to:

- 02.01 Convert actual distance to blueprint/sketch dimensions.
- 02.02 Develop sketches from data.

03.0 DEMONSTRATE UNDERSTANDING OF SAFETY ENGINEERING TECHNIQUES--The student will be able to:

- 03.01 Apply sound/noise control concepts to operating equipment.
- 03.02 Apply equipment guarding techniques to operating equipment.
- 03.03 Determine dust control measures needed in an operational situation.

04.0 ANALYZE WORK PLACE ENVIRONMENTAL ELEMENTS--The student will be able to:

- 04.01 Analyze air samples for dust.
- 04.02 Analyze air samples for toxic fumes.
- 04.03 Determine minimum exposure times for workers, using a D6 meter.
- 04.04 Analyze the ergonomics of a work site.

05.0 DEMONSTRATE UNDERSTANDING OF METHODS FOR CORRECTING OR PREVENTING UNSAFE CONDITIONS--The student will be able to:

- 05.01 Explain the purpose of the American National Standards Institute and similar organizations.
- 05.02 Using standards tables, compute the minimum acceptable standards for state situations.
- 05.03 Using State and Federal Code and Regulations, determine acceptable work place standards.
- 05.04 Set up a preventative maintenance schedule for a facility and equipment.

06.0 PERFORM COST ANALYSIS OF CORRECTIVE MEASURES--The student will be able to:

- 06.01 Compute cost benefit and cost of alternative corrective measures.

06.02 Compute cost of down time versus cost of maintenance.
06.03 Compute cost of repairs versus cost of replacements, including tax benefits to company.

07.0 INTERPRET RELATED LEGISLATION--The student will be able to:

07.01 Explain how legislative or Congressional action becomes regulation.
07.02 Explain how regulatory agencies determine final regulation.
07.03 Given a specific regulation, explain how to get regulatory agency clarification.
07.04 Determine how equipment and work conditions comply with state regulations.

08.0 READ, INTERPRET AND WRITE TECHNICAL REPORTS--The student will be able to:

08.01 Summarize a technical report.
08.02 Develop bar and line graphs.
08.03 Write a justification for corrective action.

09.0 DEVELOP SAFETY TRAINING PROGRAMS FOR HAZARDOUS WORK ENVIRONMENTS--The student will be able to:

09.01 Perform a job safety analysis.
09.02 Determine the safe and proper methods for doing a job.
09.03 Develop a training plan to insure development of proper work habits in workers trained.
09.04 Develop a refresher training program to review the safe and efficient methods of working in a hazardous area.

10.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

10.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
10.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
10.03 Read and follow written and oral instructions.
10.04 Answer and ask questions coherently and concisely.
10.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
10.06 Demonstrate appropriate telephone/communication skills.

11.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

11.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
11.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
11.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

11.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

11.05 Demonstrate an understanding of federal, state and local taxes and their computation.

12.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

12.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

12.02 Draw conclusions or make inferences from data.

12.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

12.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

13.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

13.01 Conduct a job search.

13.02 Secure information about a job.

13.03 Identify documents which may be required when applying for a job interview.

13.04 Complete a job application form correctly.

13.05 Demonstrate competence in job interview techniques.

13.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

13.07 Identify acceptable work habits.

13.08 Demonstrate knowledge of how to make job changes appropriately.

13.09 Demonstrate acceptable employee health habits.

13.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

14.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

14.01 Define entrepreneurship.

14.02 Describe the importance of entrepreneurship to the American economy.

14.03 List the advantages and disadvantages of business ownership.

14.04 Identify the risks involved in ownership of a business.

14.05 Identify the necessary personal characteristics of a successful entrepreneur.

14.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	School Bus Driver Training
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I490215**
CIP Number	0649.020501
Grade Level	30, 31
Length	40 hours
Certification	SC BS DR T @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as school bus drivers (97111932), (63-010), or to provide supplemental training for persons previously or currently employed in this occupation.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, operation of buses, loading, unloading, and transporting students, reporting delays or accidents on the road, and keeping records.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the School Bus Driver Training industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or driving range activities are an integral part of this program and provide instruction in loading, backing and maneuvering, both on a practice field and on public roads and highways with other traffic.

III. **SPECIAL NOTE:** In accordance with Rule 6A-3.0141(4), FAC, a certification of completion provided by the Commissioner shall be issued by the District to each driver successfully completing the forty (40) hours of pre-service training.

The typical length of this program for the average achieving student is 40 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Perform pre-trip inspection of vehicle.
02.0 Perform recordkeeping.
03.0 Place vehicle in motion.
04.0 Slow and stop vehicle.
05.0 Operate vehicle safely and efficiently in traffic, passing and turning.
06.0 Exhibit good general driving ability and habits.

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07.0 Demonstrate ability to give emergency first aid.
08.0 Demonstrate appropriate communication skills.
09.0 Demonstrate appropriate math skills.
10.0 Demonstrate appropriate understanding of basic science.
11.0 Demonstrate employability skills.
12.0 Demonstrate an understanding of entrepreneurship.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: School Bus Driver Training
Secondary Number:
Postsecondary Number: I490215

01.0 PERFORM PRE-TRIP INSPECTION OF VEHICLE--The student will be able to:

01.01 Check for and interpret fluid leaks on the ground.
01.02 Check for underinflated, flat, worn, or damaged tires.
01.03 Check for loose or missing lug nuts.
01.04 Check the physical appearance of the bus.
01.05 Check the engine compartment fluid levels.
01.06 Check the condition of the engine compartment drive belts.
01.07 Check the condition of the engine wiring harness.
01.08 Check the condition of the spark plug wires.
01.09 Check the condition of all hoses.
01.10 Properly check the fire extinguisher.
01.11 Check the condition of the first aid kit.
01.12 Check quantity and secure mounting of the reflective triangles.
01.13 Properly adjust the driver's seat and seatbelt.
01.14 Check and adjust all mirrors.
01.15 Check brake system for proper vacuum or air pressure.
01.16 Assure adequate fuel level for the trip.
01.17 Check for adequate oil pressure.
01.18 Check the charging system for proper operation.
01.19 Determine that the engine cooling system is operating normally.
01.20 Check the directional signals.
01.21 Check the pupil warning lights.
01.22 Check the tail lights.
01.23 Check the interior bus lights.
01.24 Check the defrosters.
01.25 Check the heater system.
01.26 Check the service door.
01.27 Check the emergency door.
01.28 Check the clearance and I.D. lights.
01.29 Check the stop lights.
01.30 Check the emergency flashers.
01.31 Check the headlights.
01.32 Check the stop arm and lights.
01.33 Check the operation of the horn.
01.34 Inspect the bus interior for cleanliness.
01.35 Check the exhaust system for leaks.
01.36 Perform an operational test of the brake system.
01.37 Check for unusual or strong odors.
01.38 Check for loose or too stiff steering.

02.0 PERFORM RECORDKEEPING--The student will be able to:

02.01 Keep the route book up to date.
02.02 Prepare an accident report.

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02.03 Report any unsafe conditions on the county-developed bus inspection form.
02.04 Note all times and odometer readings on the field trip form.
02.05 Perform any other recordkeeping as required by the Transportation Department.

03.0 PLACE VEHICLE IN MOTION--The student will be able to:

03.01 Insert key in ignition.
03.02 Close the doors.
03.03 Adjust the driver's seat.
03.04 Adjust the driver's seat belt.
03.05 Check the mirrors for proper adjustment.
03.06 Set the parking brake.
03.07 Place gear selector in neutral for manual shift; neutral or park for automatic.
03.08 Press clutch (manual shift).
03.09 Turn key to start position and release when the engine starts.
03.10 Place a vehicle with a standard transmission in motion.
03.11 Place a vehicle with an automatic transmission in motion.

04.0 SLOW AND STOP VEHICLE--The student will be able to:

04.01 Check and evaluate traffic conditions.
04.02 Position the vehicle appropriately.
04.03 Release the accelerator.
04.04 Brake to a smooth stop.
04.05 Press clutch just prior to a complete stop (manual shift).
04.06 Shift to an appropriate gear position.
04.07 Set the parking brake.
04.08 Turn off all accessories and ignition.

05.0 OPERATE VEHICLE SAFELY AND EFFICIENTLY IN TRAFFIC, PASSING, AND TURNING--The student will be able to:

05.01 Determine safe following distances under all weather conditions.
05.02 Demonstrate proper procedures for crossing railroad tracks.
05.03 Demonstrate knowledge of which driver must yield the right-of-way in various situations.
05.04 Demonstrate proper knowledge and understanding of green, yellow and red traffic signals.
05.05 Explain when passing on the right and on the left is permitted and/or prohibited.
05.06 Demonstrate ability to make a right turn.
05.07 Demonstrate ability to make a left turn.

06.0 EXHIBIT GOOD GENERAL DRIVING ABILITY AND HABITS--The student will be able to:

06.01 Identify the meaning of the standard colors used on traffic signs.
06.02 Identify the meaning of the standard shapes used on traffic signs.

06.03 Identify standard roadway markings.
06.04 Identify and list a set of principles for preventing and correcting any kind of traction loss.
06.05 Explain the correct response for loss of brakes.
06.06 Explain the correct response for steering failure.
06.07 Explain the correct response for tire blow-out.
06.08 Explain the correct response for headlight failure.
06.09 Explain the correct response for accelerator sticking.
06.10 Explain the correct response for engine overheating.
06.11 Identify the three classifications of fires and name the types of fire extinguishers for each.
06.12 Explain emergency evacuation procedures.
06.13 Explain the requirements and correct procedures for staking out a disabled school bus.
06.14 Explain the legal requirements and recommendations on stop locations for loading and unloading passengers.
06.15 Describe the proper and improper use of the alternately flashing red and amber pupil warning lights.
06.16 Correctly sequence the necessary actions for loading passengers on the highway or street.
06.17 Correctly sequence the necessary actions for loading passengers on school or other private property.
06.18 Correctly sequence the necessary actions for loading passengers at a turn-around stop.
06.19 Correctly sequence the necessary actions for unloading passengers on school or other private property.
06.20 Correctly sequence the necessary actions for unloading passengers on the highway or street.
06.21 Correctly sequence the necessary actions for unloading passengers at a turn-around stop.
06.22 Explain the procedure for reporting motorists who illegally pass the bus when loading and unloading passengers.
06.23 Explain the importance of maintaining an accurate time schedule.
06.24 Describe the nature of young people.
06.25 Describe the stages of human development.
06.26 Explain how desires, fears, and drives of young people motivate their behavior.
06.27 Identify common characteristics of people and describe how to deal with these characteristics.
06.28 Identify negative roadblocks to effective communications with students.
06.29 Identify driver actions that affect positive student behavior.
06.30 State the responsibilities of the passenger management team members.
06.31 Explain how to communicate important information to exceptional education children.
06.32 Explain how to handle behavior problems with special education children.
06.33 Explain how to handle health problems with exceptional education children.
06.34 Explain when and how exceptional children should be evacuated from a school bus.
06.35 Explain the proper treatment for handling on-board seizures.

06.36 Explain the use and importance of the medical information card.

07.0 DEMONSTRATE THE ABILITY TO GIVE FIRST AID--The student will be able to:

07.01 Explain and demonstrate the proper procedure for mouth-to-mouth and mouth-to-nose resuscitation.
07.02 Explain and demonstrate the proper procedure for clearing an obstructed airway.
07.03 Explain and demonstrate the proper methods of controlling bleeding.
07.04 Identify the symptoms of shock and explain the proper procedure for treating shock.
07.05 Explain the proper treatment for eye injuries, vomiting, mouth or face injuries, fainting, falls, and epileptic seizures.
07.06 Identify the location and contents of the first aid kit.

08.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

08.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
08.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
08.03 Read and follow written and oral instructions.
08.04 Answer and ask questions coherently and concisely.
08.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
08.06 Demonstrate appropriate telephone/communication skills.

09.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

09.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
09.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
09.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
09.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
09.05 Demonstrate an understanding of federal, state and local taxes and their computation.

10.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

10.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
10.02 Draw conclusions or make inferences from data.
10.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
10.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

11.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

11.01 Conduct a job search.
11.02 Secure information about a job.
11.03 Identify documents which may be required when applying for a job interview.
11.04 Complete a job application form correctly.
11.05 Demonstrate competence in job interview techniques.
11.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
11.07 Identify acceptable work habits.
11.08 Demonstrate knowledge of how to make appropriate job changes.
11.09 Demonstrate acceptable employee health habits.
11.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

12.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

12.01 Identify characteristics of the American enterprise system.
12.02 Define inflation and deflation.
12.03 Illustrate the basic economic questions facing any society.
12.04 Determine the results of a change in demand or a change in supply.
12.05 List factors which contribute to economic growth.
12.06 Identify characteristics of different types of business ownership.
12.07 Choose appropriate action in a situation requiring application of business ethics.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Sheet Metal Fabrication Technology	
Occupational Area:	Industrial Education	
	Secondary	PSAV
Program Numbers	**8754100**	**I480506**
CIP Number	0648.050600	0648.050600
Grade Level	9-12, 30, 31	30, 31
Length	6 credits	900 hours
Certification	SHEETMETAL @7 G METAL WORK @7 G	SHEETMETAL @7 G METAL WORK @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as sheet metal workers (89132704, machine helpers (619.687-014), template cutters (703.684-018).

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and the layout, fabrication, erection, or installation and maintenance of items made of sheet steel, copper, stainless steel and aluminum using hand tools and machines.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Sheet Metal industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

Listed below are the courses that comprise this program when offered at the secondary level:

8754110 - Sheet Metal Fabrication Technology 1
8754120 - Sheet Metal Fabrication Technology 2
8754130 - Sheet Metal Fabrication Technology 3
8754140 - Sheet Metal Fabrication Technology 4
8754150 - Sheet Metal Fabrication Technology 5
8754160 - Sheet Metal Fabrication Technology 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Sheet Metal industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in layout, cutting, forming, fabricating and installing mechanical, architectural, and specialty metal products.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

The outcomes and student performance standards which the handicapped student must master must be specified in each student's Individual Education Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 900 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate understanding of procedures and trade safety practices.
02.0 Read blueprints.
03.0 Lay out sheet metal.
04.0 Fabricate mechanical systems.
05.0 Fabricate architectural/roofing sheet metal.
06.0 Fabricate specialty sheet metal.
07.0 Fabricate food and beverage dispensing equipment.
08.0 Weld sheet metal.
09.0 Install mechanical systems.
10.0 Install architectural/roofing sheet metal.
11.0 Demonstrate appropriate communication skills.
12.0 Demonstrate appropriate math skills.
13.0 Demonstrate appropriate understanding of basic science.
14.0 Demonstrate employability skills.
15.0 Demonstrate an understanding of entrepreneurship.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Sheet Metal Fabrication Technology
Secondary Number: 8754100
Postsecondary Number: I480506

01.0 DEMONSTRATE UNDERSTANDING OF PROCEDURES AND TRADE SAFETY PRACTICES--The student will be able to:

- 01.01 Apply safety rules and procedures.
- 01.02 Explain school/class procedures.
- 01.03 Demonstrate use and care of tools.

02.0 READ BLUEPRINTS--The student will be able to:

- 02.01 Interpret detail drawings.
- 02.02 Read symbols.
- 02.03 List materials for fabrication from blueprints.
- 02.04 Develop shop drawings.

03.0 LAY OUT SHEET METAL--The student will be able to:

- 03.01 Lay out rectangular straight duct.
- 03.02 Lay out rectangular square throat and square heel duct elbow.
- 03.03 Lay out rectangular duct ogee offset.
- 03.04 Lay out rectangular taper duct (centerline taper).
- 03.05 Lay out rectangular duct Y branch.
- 03.06 Lay out round straight duct.
- 03.07 Lay out round duct elbow.
- 03.08 Lay out round duct Y branch.
- 03.09 Lay out round duct offset.
- 03.10 Lay out round duct taper (transitional).
- 03.11 Lay out round duct lateral (round tap).
- 03.12 Lay out batten seam metal roof panel and cap.
- 03.13 Lay out square happer.
- 03.14 Lay out belt guard.

04.0 FABRICATE MECHANICAL SYSTEMS--The student will be able to:

- 04.01 Fabricate rectangular radius throat and radius heel duct elbow.
- 04.02 Fabricate rectangular square throat and square heel duct elbow.
- 04.03 Fabricate rectangular duct ogee offset.
- 04.04 Fabricate rectangular duct transition.
- 04.05 Fabricate rectangular duct Y branch.
- 04.06 Fabricate rectangular shoe tap.
- 04.07 Fabricate round straight duct.
- 04.08 Fabricate round duct elbow.
- 04.09 Fabricate round duct Y branch.
- 04.10 Fabricate round duct offset.
- 04.11 Fabricate round duct taper (transitional).
- 04.12 Fabricate round duct lateral (round tap).
- 04.13 Fabricate round saddle tap.

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04.14 Fabricate single wall equipment casing/housing.
04.15 Fabricate flat S.
04.16 Fabricate bar S.
04.17 Fabricate drive cleat.
04.18 Fabricate pocket government lock.
04.19 Fabricate companion angle.
04.20 Fabricate flanged duct section.

05.0 FABRICATE ARCHITECTURAL/ROOFING SHEET METAL--The student will be able to:

05.01 Fabricate batten seam metal roof panel and cap.
05.02 Fabricate standing seam metal roof panel.
05.03 Fabricate metal flat-lock roof panel.
05.04 Fabricate ogee gutter.
05.05 Fabricate half-round gutter.
05.06 Fabricate rectangular downspout/conductor.
05.07 Fabricate offset in rectangular downspout/conductor.
05.08 Fabricate conductor head.
05.09 Fabricate flashing.
05.10 Fabricate roof coping.
05.11 Fabricate gravel stop fascia.
05.12 Fabricate metal siding panel.
05.13 Fabricate louver.
05.14 Fabricate metal ceiling panel.

06.0 FABRICATE SPECIALTY SHEET METAL--The student will be able to:

06.01 Fabricate rectangular single blade damper in frame.
06.02 Fabricate rectangular tube.
06.03 Fabricate round tube.
06.04 Fabricate hollow metal letter.
06.05 Fabricate round duct support saddle (floor mounted).
06.06 Fabricate belt guard.
06.07 Fabricate blind/drapery pocket (cornice).

07.0 FABRICATE FOOD AND BEVERAGE DISPENSING EQUIPMENT--The student will be able to:

07.01 Fabricate counter top.
07.02 Fabricate shelf.
07.03 Fabricate cabinet shell.
07.04 Fabricate cabinet drawer.
07.05 Fabricate cabinet sliding door.

08.0 WELD SHEET METAL--The student will be able to:

08.01 Weld aluminum with gas tungsten arc welding (GTAW) equipment.
08.02 Weld aluminum with gas metal arc welding (GMAW) equipment.
08.03 Weld stainless steel with gas metal arc welding (GMAW) equipment.
08.04 Weld stainless steel with shielded metal arc welding (SMAW) equipment.

08.05 Weld stainless steel with gas tungsten arc welding (GTAW) equipment.
08.06 Weld galvanized steel with carbon arc welding (CAW) equipment.
08.07 Braze galvanized steel.
08.08 Grind and polish metal.
08.09 Solder galvanized steel, copper and stainless steel.

09.0 INSTALL MECHANICAL SYSTEMS--The student will be able to:

09.01 Install rectangular duct system.
09.02 Install round duct system.
09.03 Install single wall equipment casing/housing.

10.0 INSTALL ARCHITECTURAL/ROOFING SHEET METAL--The student will be able to:

10.01 Install batten seam metal roof panel and cap.
10.02 Install standing seam metal roof panel.
10.03 Install metal flat-lock roof panel.
10.04 Install ogee gutter.
10.05 Install half-round gutter.
10.06 Install rectangular downspout/conductor.
10.07 Install offset in rectangular downspout/conductor.
10.08 Install conductor head.
10.09 Install flashing.
10.10 Install coping.
10.11 Install gravel stop fascia.
10.12 Install metal siding.

11.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

11.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
11.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
11.03 Read and follow written and oral instructions.
11.04 Answer and ask questions coherently and concisely.
11.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
11.06 Demonstrate appropriate telephone/communication skills.

12.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

12.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
12.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
12.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
12.05 Demonstrate an understanding of federal, state and local taxes and their computation.

13.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

13.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
13.02 Draw conclusions or make inferences from data.
13.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
13.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

14.01 Conduct a job search.
14.02 Secure information about a job.
14.03 Identify documents which may be required when applying for a job interview.
14.04 Complete a job application form correctly.
14.05 Demonstrate competence in job interview techniques.
14.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
14.07 Identify acceptable work habits.
14.08 Demonstrate knowledge of how to make job changes appropriately.
14.09 Demonstrate acceptable employee health habits.
14.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

15.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

15.01 Define entrepreneurship.
15.02 Describe the importance of entrepreneurship to the American economy.
15.03 List the advantages and disadvantages of business ownership.
15.04 Identify the risks involved in ownership of a business.
15.05 Identify the necessary personal characteristics of a successful entrepreneur.
15.06 Identify the business skills needed to operate a small business efficiently and effectively.

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July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754110
Course Title: Sheet Metal Fabrication Technology 1
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide an introduction to basic safety rules and procedures, school and classroom/lab procedures and the basic use and care of sheet metal hand tools. Students will be provided instruction in blueprint reading, interpreting drawings, reading symbols, testing materials and developing shop drawings.

01.0 DEMONSTRATE UNDERSTANDING OF PROCEDURES AND TRADE SAFETY PRACTICES--The student will be able to:

- 01.01 Apply safety rules and procedures.
- 01.02 Explain school/class procedures.
- 01.03 Demonstrate use and care of tools.

02.0 READ BLUEPRINTS--The student will be able to:

- 02.01 Interpret detail drawings.
- 02.02 Read symbols.
- 02.03 List materials for fabrication from blueprints.
- 02.04 Develop shop drawings.

11.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 11.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 11.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 11.03 Read and follow written and oral instructions.
- 11.04 Answer and ask questions coherently and concisely.
- 11.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 11.06 Demonstrate appropriate telephone/communication skills.

13.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 13.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 13.02 Draw conclusions or make inferences from data.
- 13.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

13.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

15.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

15.01 Define entrepreneurship.
15.02 Describe the importance of entrepreneurship to the American economy.
15.03 List the advantages and disadvantages of business ownership.
15.04 Identify the risks involved in ownership of a business.
15.05 Identify the necessary personal characteristics of a successful entrepreneur.
15.06 Identify the business skills needed to operate a small business efficiently and effectively.

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July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754120
Course Title: Sheet Metal Fabrication Technology 2
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide basic competencies in sheet metal layout as well as the basic competencies required in mechanical systems fabrication.

03.0 LAY OUT SHEET METAL--The student will be able to:

- 03.01 Lay out rectangular straight duct.
- 03.02 Lay out rectangular square throat and square heel duct elbow.
- 03.03 Lay out rectangular duct ogee offset.
- 03.04 Lay out rectangular taper duct (centerline taper).
- 03.05 Lay out rectangular duct Y branch.
- 03.06 Lay out round straight duct.
- 03.07 Lay out round duct elbow.
- 03.08 Lay out round duct Y branch.
- 03.09 Lay out round duct offset.
- 03.10 Lay out round duct taper (transitional).
- 03.11 Lay out round duct lateral (round tap).
- 03.12 Lay out batten seam metal roof panel and cap.
- 03.13 Lay out square happer.
- 03.14 Lay out belt guard.

04.0 FABRICATE MECHANICAL SYSTEMS--The student will be able to:

- 04.01 Fabricate rectangular radius throat and radius heel duct elbow.
- 04.02 Fabricate rectangular square throat and square heel duct elbow.
- 04.03 Fabricate rectangular duct ogee offset.
- 04.04 Fabricate rectangular duct transition.
- 04.05 Fabricate rectangular duct Y branch.
- 04.06 Fabricate rectangular shoe tap.
- 04.07 Fabricate round straight duct.
- 04.08 Fabricate round duct elbow.
- 04.09 Fabricate round duct Y branch.
- 04.10 Fabricate round duct offset.
- 04.11 Fabricate round duct taper (transitional).
- 04.12 Fabricate round duct lateral (round tap).
- 04.13 Fabricate round saddle tap.
- 04.14 Fabricate single wall equipment casing/housing.
- 04.15 Fabricate flat S.
- 04.16 Fabricate bar S.
- 04.17 Fabricate drive cleat.
- 04.18 Fabricate pocket government lock.
- 04.19 Fabricate companion angle.
- 04.20 Fabricate flanged duct section.

12.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

12.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

12.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

12.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

12.05 Demonstrate an understanding of federal, state and local taxes and their computation.

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July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754130
Course Title: Sheet Metal Fabrication Technology 3
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in architectural/roofing Sheet Metal Fabrication Technology and instruction in specialty Sheet Metal Fabrication Technology.

05.0 FABRICATE ARCHITECTURAL/ROOFING SHEET METAL--The student will be able to:

- 05.01 Fabricate batten seam metal roof panel and cap.
- 05.02 Fabricate standing seam metal roof panel.
- 05.03 Fabricate metal flat-lock roof panel.
- 05.04 Fabricate ogee gutter.
- 05.05 Fabricate half-round gutter.
- 05.06 Fabricate rectangular downspout/conductor.
- 05.07 Fabricate offset in rectangular downspout/conductor.
- 05.08 Fabricate conductor head.
- 05.09 Fabricate flashing.
- 05.10 Fabricate roof coping.
- 05.11 Fabricate gravel stop fascia.
- 05.12 Fabricate metal siding panel.
- 05.13 Fabricate louver.
- 05.14 Fabricate metal ceiling panel.

06.0 FABRICATE SPECIALTY SHEET METAL--The student will be able to:

- 06.01 Fabricate rectangular single blade damper in frame.
- 06.02 Fabricate rectangular tube.
- 06.03 Fabricate round tube.
- 06.04 Fabricate hollow metal letter.
- 06.05 Fabricate round duct support saddle (floor mounted).
- 06.06 Fabricate belt guard.
- 06.07 Fabricate blind/drapery pocket (cornice).

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754140
Course Title: Sheet Metal Fabrication Technology 4
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in fabricating food and beverage dispensing equipment and introduction of basic competencies required in sheet metal welding including aluminum/gas tungsten arc, stainless steel/arc, gas-tungsten, carbon arc and brazing, grinding, soldering and polishing metal.

07.0 FABRICATE FOOD AND BEVERAGE DISPENSING EQUIPMENT--The student will be able to:

- 07.01 Fabricate counter top.
- 07.02 Fabricate shelf.
- 07.03 Fabricate cabinet shell.
- 07.04 Fabricate cabinet drawer.
- 07.05 Fabricate cabinet sliding door.

08.0 WELD SHEET METAL--The student will be able to:

- 08.01 Weld aluminum with gas tungsten arc welding (GTAW) equipment.
- 08.02 Weld aluminum with gas metal arc welding (GMAW) equipment.
- 08.03 Weld stainless steel with gas metal arc welding (GMAW) equipment.
- 08.04 Weld stainless steel with shielded metal arc welding (SMAW) equipment.
- 08.05 Weld stainless steel with gas tungsten arc welding (GTAW) equipment.
- 08.06 Weld galvanized steel with carbon arc welding (CAW) equipment.
- 08.07 Braze galvanized steel.
- 08.08 Grind and polish metal.
- 08.09 Solder galvanized steel, copper and stainless steel.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754150
Course Title: Sheet Metal Fabrication Technology 5
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide instruction in the basic competencies required in the installation of sheet metal systems.

09.0 INSTALL MECHANICAL SYSTEMS--The student will be able to:

09.01 Install rectangular duct system.
09.02 Install round duct system.
09.03 Install single wall equipment casing/housing.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8754160
Course Title: Sheet Metal Fabrication Technology 6
Course Credit: 1

COURSE DESCRIPTION:

This course is designed to provide the student with an opportunity to develop competencies in the installation of architectural/roofing systems.

10.0 INSTALL ARCHITECTURAL/ROOFING SHEET METAL--The student will be able to:

- 10.01 Install batten seam metal roof panel and cap.
- 10.02 Install standing seam metal roof panel.
- 10.03 Install metal flat-lock roof panel.
- 10.04 Install ogee gutter.
- 10.05 Install half-round gutter.
- 10.06 Install rectangular downspout/conductor.
- 10.07 Install offset in rectangular downspout/conductor.
- 10.08 Install conductor head.
- 10.09 Install flashing.
- 10.10 Install coping.
- 10.11 Install gravel stop fascia.
- 10.12 Install metal siding.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 14.01 Conduct a job search.
- 14.02 Secure information about a job.
- 14.03 Identify documents which may be required when applying for a job interview.
- 14.04 Complete a job application form correctly.
- 14.05 Demonstrate competence in job interview techniques.
- 14.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
- 14.07 Identify acceptable work habits.
- 14.08 Demonstrate knowledge of how to make job changes appropriately.
- 14.09 Demonstrate acceptable employee health habits.
- 14.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Solar Heating and Cooling Technology
Occupational Area:	Industrial
	PSV
CIP Number	0615.050500
Grade Level	College Credits
Length	AS Degree/64

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as a solar engineering technician, heating technician (007.181-010), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, solar system planning, installation, repair and maintenance, prevailing building codes, and retro-fitting existing structures with solar systems.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Solar Heating and Cooling industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in design, installation, and testing of solar equipment assemblies.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Read and interpret blueprints, schematics, and building codes.
02.0 Demonstrate basic plumbing skills.
03.0 Demonstrate basic carpentry and roofing skills.
04.0 Demonstrate basic electrical skills.
05.0 Demonstrate knowledge of basic control systems.
06.0 Demonstrate knowledge of prevailing building codes.
07.0 Assist with the design, installation and testing of solar equipment systems.
08.0 Troubleshoot malfunctioning active and passive solar heating systems.
09.0 Perform cost estimates.
10.0 Perform cost comparisons of alternative systems.
11.0 Prepare, analyze, and evaluate technical reports and data.
12.0 Demonstrate knowledge of insulating and conductive properties of materials.
13.0 Demonstrate appropriate communication skills.
14.0 Demonstrate appropriate math skills.
15.0 Demonstrate appropriate understanding of basic science.
16.0 Demonstrate employability skills.
17.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Solar Heating And Cooling Technology
Secondary Number:
Postsecondary Number: 0615.050500

01.0 READ AND INTERPRET BLUEPRINTS, SCHEMATICS, AND BUILDING CODES--The student will be able to:

- 01.01 Identify architectural symbols.
- 01.02 Identify electrical symbols.
- 01.03 Identify mechanical symbols.
- 01.04 Identify topographical symbols.
- 01.05 Interpret land surveyor's notes.
- 01.06 Interpret architectural drawings and specifications.
- 01.07 Interpret structural drawings.
- 01.08 Apply A.S.T.M. standards.
- 01.09 Apply C.S.A. standards.
- 01.10 Evaluate shop drawings.
- 01.11 Interpret mechanical drawings.
- 01.12 Interpret electrical drawings.

02.0 DEMONSTRATE BASIC PLUMBING SKILLS--The student will be able to:

- 02.01 Braze aluminum tubing.
- 02.02 Cut copper tubing.
- 02.03 Bend cooper tubing.
- 02.04 Braze weld copper tubing.
- 02.05 Cut steel pipe.
- 02.06 Cut PVC pipe.
- 02.07 Dislodge obstructions from tubing.
- 02.08 Flare cooper tubing.
- 02.09 Braze two metal joints.
- 02.10 Assemble specialized fittings.
- 02.11 Install pipe.
- 02.12 Secure pipe to various surfaces.
- 02.13 Insulate water pipes.
- 02.14 Pressure test water system.
- 02.15 Select appropriate water system components.

03.0 DEMONSTRATE BASIC CARPENTRY AND ROOFING SKILLS--The student will be able to:

- 03.01 Estimate materials.
- 03.02 Maintain tools as needed.
- 03.03 Install rough frame.
- 03.04 Install diagonal bracing.
- 03.05 Construct roof truss.
- 03.06 Install collar beams.
- 03.07 Install rafters.
- 03.08 Install roofing felt.
- 03.09 Install shingles.

03.10 Operate hand tools.
03.11 Cut materials to size.

04.0 DEMONSTRATE BASIC ELECTRICAL SKILLS--The student will be able to:

04.01 Calculate circuit load.
04.02 Select conductors.
04.03 Connect wiring to specified terminals.
04.04 Install circuit box.
04.05 Ground electrical system.
04.06 Install outlets.

05.0 DEMONSTRATE KNOWLEDGE OF BASIC CONTROL SYSTEMS--The student will be able to:

05.01 Mount temperature sensors.
05.02 Install central wiring.
05.03 Install valve operators.
05.04 Install damper operators.
05.05 Calibrate sensors.

06.0 DEMONSTRATE KNOWLEDGE OF PREVAILING BUILDING CODES--The student will be able to:

06.01 Apply O.S.H.A. standard.
06.02 Apply local codes.
06.03 Interpret application of regulations.

07.0 ASSIST WITH THE DESIGN, INSTALLATION AND TESTING OF SOLAR EQUIPMENT SYSTEMS--The student will be able to:

07.01 Select heat storage unit.
07.02 Select auxiliary boiler.
07.03 Design collector system.
07.04 Design heat transfer medium.
07.05 Position dampers.
07.06 Install control blowers.
07.07 Install louver-type dampers.
07.08 Install back-draft dampers.
07.09 Design filters.
07.10 Design duct installation.
07.11 Construct pebble bed containers.

08.0 TROUBLESHOOT MALFUNCTIONING ACTIVE AND PASSIVE SOLAR HEATING SYSTEM--The student will be able to:

08.01 Check conditions of collectors and heat exchangers.
08.02 Check piping, storage tanks and pumps.
08.03 Evaluate valves for leakage.
08.04 Evaluate condition of insulation.
08.05 Check fluid levels.
08.06 Check antifreeze concentration in collector circuit.
08.07 Lubricate pump and blower motors.
08.08 Align blowers wheels.

08.09 Clean air filters.
08.10 Adjust air-flow.
08.11 Check control system for sensing.

09.0 PERFORM COST ESTIMATES--The student will be able to:

09.01 Read supply catalogs.
09.02 Price labor costs.
09.03 Determine profit margin.
09.04 Schedule time required.
09.05 Calculate total expenses.
09.06 Develop actual consumer cost.

10.0 PERFORM COST COMPARISONS OF ALTERNATIVE SYSTEMS--The student will be able to:

10.01 Identify other solar systems.
10.02 Compare characteristics as needed.
10.03 Analyze costs.

11.0 PREPARE, ANALYZE, AND EVALUATE TECHNICAL REPORTS AND DATA--The student will be able to:

11.01 Write description of system design.
11.02 Collect specification data from operable system.
11.03 Evaluate operation of system.

12.0 DEMONSTRATE KNOWLEDGE OF INSULATING AND CONDUCTIVE PROPERTIES OF MATERIALS--The student will be able to:

12.01 Identify various insulations.
12.02 Select appropriate insulations based on system design.
12.03 Install various insulations.

13.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

13.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
13.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
13.03 Read and follow written and oral instructions.
13.04 Answer and ask questions coherently and concisely.
13.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
13.06 Demonstrate appropriate telephone/communication skills.

14.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

14.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

14.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

14.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

14.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

14.05 Demonstrate an understanding of federal, state and local taxes and their computation.

15.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

15.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

15.02 Draw conclusions or make inferences from data.

15.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

15.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

16.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

16.01 Conduct a job search.

16.02 Secure information about a job.

16.03 Identify documents which may be required when applying for a job interview.

16.04 Complete a job application form correctly.

16.05 Demonstrate competence in job interview techniques.

16.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

16.07 Identify acceptable work habits.

16.08 Demonstrate knowledge of how to make appropriate job changes.

16.09 Demonstrate acceptable employee health habits.

16.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define entrepreneurship.

17.02 Describe the importance of entrepreneurship to the American economy.

17.03 List the advantages and disadvantages of business ownership.

17.04 Identify the risks involved in ownership of a business.

17.05 Identify the necessary personal characteristics of a successful entrepreneur.

17.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Space Engineering Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.080101
Grade Level	College Credits
Length	AS Degree/64

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for initial employment as technicians at space vehicle launch facilities or to provide supplemental training for persons previously or currently employed in these occupations.

The specialization content should include, but not be limited to, Basic Electricity & Instrumentation, Soldering, Engineering Graphics, Engineering Machine Practices, Microcomputer Applications and Quality Assurance. A minimum of 15 semester hours with at least two components of this core must be of courses designed to develop skills in oral and written communication and in computational skills. Integrated into this content will be leadership skills, human relation skills, employability skills, safe and efficient work practices, technical recording and reporting.

Elective competencies are chosen from courses in Thermal Protection Systems, Electrical & Mechanical Systems, Management, Computer Aided Drafting, Environmental Control Systems, Non-Destructive Testing, and Digital Logic.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Space Engineering industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Electronic laboratory activities are an integral part of this program. The tools, test equipment, materials and processes used in this laboratory are similar to those used in industry. Students should be able to use the various types of precision test equipment found in general use throughout the electronics industry.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the

activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

This program includes a common core of general education competencies as identified by the industry, which is prerequisite for all Associate in Science Degree programs.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

Instruction in microcomputer applications and high level languages is appropriate for inclusion in this program. Algebra is a recommended prerequisite for entry into this program.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an A.S. degree.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in the fundamental principles of electricity and electronics.
02.0 Demonstrate proficiency in the operation of standard electronic test equipment to measure basic electrical parameters.
03.0 Demonstrate proficiency in the high reliability soldering and fabrication.
04.0 Demonstrate proficiency in the basics of engineering machine practices.
05.0 Demonstrate proficiency in the basics of engineering graphics.
06.0 Demonstrate proficiency in the use of word processing, spreadsheets and data management systems using microcomputers.
07.0 Demonstrate proficiency in the fundamental concepts of quality assurance.
08.0 Demonstrate proficiency in modern quality assurance inspection techniques.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate appropriate math skills.

11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate employability skills.
13.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Space Engineering Technology
Secondary Number:
Postsecondary Number: 0615.080101

01.0 DEMONSTRATE PROFICIENCY IN THE FUNDAMENTAL PRINCIPLES OF ELECTRICITY AND ELECTRONICS--The student will be able to:

01.01 Explain the relationship between current, voltage, resistance and power.
01.02 Solve DC network problems involving series, parallel and series-parallel networks.
01.03 Using a schematic diagram as a guide, construct and evaluate the operation of basic DC circuits.
01.04 Given a wiring diagram of a circuit containing DC components, draw a schematic diagram of the circuit.
01.05 Use analog and digital multimeters to measure voltage, current and resistance in simple and complex circuits.
01.06 Explain and demonstrate the properties of various types of batteries and other energy storage devices.
01.07 Demonstrate the application of network theorems including Kirchoff's voltage and current laws and the superposition theorem.
01.08 Evaluate the sinusoidal (AC) waveform.
01.09 Describe and explain the operation of circuits containing R, L, and C elements.
01.10 Explain the relationship between current, voltage, resistance and power in AC circuits.
01.11 Solve AC network problems involving series, parallel and series-parallel networks.
01.12 Using a schematic diagram as a guide, construct and evaluate the operation of basic AC circuits.
01.13 Given a wiring diagram of a circuit containing DC and AC components, draw a schematic diagram of the circuit.
01.14 Use analog and digital multimeters to measure voltage, current in simple and complex AC circuits.
01.15 Demonstrate the analysis of multi-source AC networks.
01.16 Demonstrate the application of network theorems including Kirchoff's voltage and current laws and the superposition theorem in AC circuits.
01.17 Explain and demonstrate the operation of resonant networks.
01.18 Explain the basic properties of magnetic circuits.
01.19 Explain and demonstrate the operation of DC motors and generators.
01.20 Explain and demonstrate the operation of AC motors and generators.
01.21 State the basic safety procedures designed to protect personnel, the test equipment and the circuit under test.
01.22 Demonstrate the operation of meggers.
01.23 Demonstrate the operation of a reflectometer.

01.24 Demonstrate the use of a Break-Out-Box.

01.25 Explain and demonstrate the operation of semiconductor diodes and transistors.

01.26 Explain and demonstrate the operation of basic transistor circuits.

01.27 Explain and demonstrate the operation and application of simple integrated circuits including operational amplifiers.

01.28 Explain and demonstrate the operation of basic digital devices and circuits.

02.0 DEMONSTRATE PROFICIENCY IN THE OPERATION OF STANDARD ELECTRONIC TEST EQUIPMENT TO MEASURE BASIC ELECTRICAL PARAMETERS--The student will be able to:

02.01 Review basic analog and digital electrical concepts and definitions.

02.02 Discuss and analyze the procedures and methods required to insure proper measurement techniques including measurement, data recording, reports, graphing, precision, accuracy, errors and statistical analysis of data.

02.03 Operate safely in the laboratory environment.

02.04 Use proper instrument grounding techniques.

02.05 Describe and demonstrate the effects of electromagnetic interference on measurement systems and the methods used to minimize these effects.

02.06 Describe and demonstrate the operation of analog DC and AC meters.

02.07 Describe and demonstrate the operation of digital DC and AC meters.

02.08 Compare analog and digital meter operation.

02.09 Describe the operation of counters, digital encoders and display devices.

02.10 Describe and demonstrate the operation of digital multimeters.

02.11 Describe the methods used in the laboratory to make accurate measurements of basic electrical parameters.

02.12 Demonstrate the operation of digital impedance meters.

02.13 Demonstrate the operation of all front panel controls of a standard laboratory oscilloscope in typical laboratory oscilloscope.

02.14 Describe the circuitry of a standard laboratory oscilloscope.

02.15 Describe and demonstrate the operation of AC and DC signal sources including laboratory power supplies, oscillators, function generators, sweep generators and RF signal generators.

02.16 Describe and demonstrate the operation of a universal counter/timer.

02.17 Demonstrate and describe the operation of a strip chart and X-Y recorders.

02.18 Describe and demonstrate the operation of transducers used to convert light, temperature, mechanical strain and

position, pressure and radiation to electrical parameters for measurement.

02.19 Analyze, describe and demonstrate the use of instrumentation amplifiers for use with transducers.

02.20 Describe the operation and application of spectrum and network analyzers.

02.21 Describe the operation and application of a cable fault analyzer.

02.22 Describe the operation and application of a megger.

02.23 Describe the operation and application of a bonding meter (Milliammeter).

02.24 Define the term calibration.

02.25 Describe some methods and the documentation of instrument calibration.

02.26 Describe NBS time and frequency standards.

02.27 Explain and describe the contents of military specifications and standards.

02.28 Construct, test and calibrate a basic test instrument.

03.0 DEMONSTRATE PROFICIENCY IN HIGH RELIABILITY SOLDERING AND FABRICATION--The student will be able to:

03.01 Review basic math and electronics concepts.

03.02 Demonstrate laboratory safety.

03.03 Explain the effects of static electricity.

03.04 Demonstrate ESD safety procedures.

03.05 Describe the construction of printed circuit boards.

03.06 Explain the theoretical concepts of soldering.

03.07 Demonstrate the use of basic hand tools.

03.08 Demonstrate proper soldering techniques--axial lead components.

03.09 Demonstrate proper unsoldering techniques--axial lead components.

03.10 Demonstrate proper soldering techniques--radial lead components.

03.11 Demonstrate proper unsoldering techniques--radial lead components.

03.12 Demonstrate proper soldering techniques--flat pack components.

03.13 Demonstrate proper unsoldering techniques--flat pack components.

03.14 Demonstrate proper soldering techniques--integrated circuit components.

03.15 Demonstrate proper unsoldering techniques--integrated circuit components.

03.16 List and discuss applicable Military Soldering Standards.

03.17 List and discuss applicable NASA Soldering Standards.

03.18 List and discuss applicable Weapons-grade Soldering Standards.

03.19 Demonstrate the soldering of wires to industrial terminals.

03.20 Demonstrate the unsoldering of wires from industrial terminals.

03.21 Discuss ground planes on multi-layer printer circuit boards.
03.22 Demonstrate basic blue print reading.
03.23 Demonstrate the techniques used for cable fabrication.
03.24 Demonstrate basic cable lacing techniques.
03.25 Demonstrate shielded cable preparation.
03.26 Demonstrate cable connector preparation.
03.27 Demonstrate cable breakout to grounds.
03.28 Demonstrate cable "Y" splitting.
03.29 Demonstrate cable "T" splitting.
03.30 Demonstrate the repair of water-proof cables.
03.31 Demonstrate cable and connector potting techniques.
03.32 Explain the theory of wire-wrap connections.
03.33 Demonstrate wire-wrap connections.
03.34 Explain the theory of PC board construction.
03.35 Describe the methods and procedures used for PC board repair.
03.36 Demonstrate cable and connector potting techniques.
03.37 Demonstrate the construction and repair of PC boards with conformal coatings.
03.38 Demonstrate the use of a PC board rework station.
03.39 Explain and demonstrate edge connector plating.
03.40 Explain and demonstrate PC board etching techniques.

04.0 DEMONSTRATE PROFICIENCY IN THE BASICS OF ENGINEERING MACHINE PRACTICES--The student will be able to:

04.01 Demonstrate the use of proper terminology in the machine shop trade.
04.02 Demonstrate safe procedures in the machine shop.
04.03 Analyze the operation of the engine lathe.
04.04 Demonstrate the use of the engine lathe.
04.05 Analyze the operation of the milling machine.
04.06 Demonstrate the use of the milling machine.
04.07 Analyze the operation of the horizontal saw.
04.08 Demonstrate the use of the horizontal saw.
04.09 Analyze the operation of the vertical saw.
04.10 Demonstrate the use of the vertical saw.
04.11 Analyze the operation of the drill press.
04.12 Demonstrate the use of the drill press.
04.13 Demonstrate the care and use of precision measuring tools and gages.
04.14 List and define the terminology used with screw thread fabrication.
04.15 Analyze and apply the formulae used for the construction of threads.
04.16 Demonstrate safe work habits and good housekeeping procedures in industrial manufacturing.

05.0 DEMONSTRATE PROFICIENCY IN THE BASICS OF ENGINEERING GRAPHICS--The student will be able to:

05.01 Demonstrate the use of basic drawing instruments.
05.02 Demonstrate basic lettering techniques.

05.03 Define the terms of importance in technical drawing.
05.04 Demonstrate basic geometric construction techniques.
05.05 Use freehand drawing to express basic ideas and to clarify and amplify concepts.
05.06 Demonstrate the use of multiview projection to provide a shape description of an object.
05.07 Demonstrate the use of sectional views to show interior parts of a complicated structure.
05.08 Use auxiliary views revolution to show true circular shapes.
05.09 Convert dimensions between ANSI and ISO systems.
05.10 Describe the use of tolerancing to insure the accurate fitting of interchangeable parts.
05.11 Draw standard screw threads, fasteners, and springs.
05.12 Describe the use of graphics to create, record, analyze, and communicate to others design concepts or ideas.
05.13 Demonstrate the use and application of pictorial drawings.
05.14 Demonstrate the use of oblique projection.
05.15 Demonstrate the use of perspective drawings.
05.16 Demonstrate the use of the basic concepts of descriptive geometry.
05.17 Define and demonstrate the use of parallelism and perpendicularity.
05.18 Construct drawings that demonstrate the use of intersections.
05.19 Describe the use of engineering graphics in cartography, geology, and spherical geometry.
05.20 Demonstrate the use of graphical vector analysis in the solution of problems using engineering data.

06.0 DEMONSTRATE PROFICIENCY IN THE USE OF WORD PROCESSING, SPREADSHEETS AND DATA MANAGEMENT SYSTEMS USING MICROCOMPUTERS--The student will be able to:

06.01 Describe the component parts of a microcomputer system.
06.02 Explain the operation of a basic microcomputer.
06.03 Demonstrate the operation of the Disk Operating System (DOS).
06.04 Demonstrate the use of basic DOS commands.
06.05 Load a word processing applications program (WordPerfect).
06.06 Create a word processor document.
06.07 Demonstrate the use of the special features of the word processor.
06.08 Modify a word processor document.
06.09 Demonstrate the use of formatting functions, file management, and macros.
06.10 Demonstrate the use of advanced WordPerfect functions.
06.11 Build a worksheet document using VP-Planner Plus.
06.12 Format and print a worksheet.
06.13 Use advanced enhancement functions with the worksheet.
06.14 Build worksheets with functions and macros.
06.15 Demonstrate the use of the worksheet graphing functions.

06.16 Sort and query a worksheet database.
06.17 Create and display a database using dBase III Plus.
06.18 Display records in a database.
06.19 Demonstrate sorting and report preparation.
06.20 Demonstrate adding, changing, and deleting records.
06.21 Demonstrate changing the database structure.
06.22 Utilize commercially available software to generate computer graphics.

07.0 DEMONSTRATE PROFICIENCY IN THE FUNDAMENTAL CONCEPTS OF QUALITY ASSURANCE--The student will be able to:

07.01 Describe the history of inspection, quality control, quality assurance, and system effectiveness.
07.02 List relevant quality organizations.
07.03 Define the terms used in the field of quality assurance.
07.04 Describe the components and organization of the basic quality system.
07.05 Describe the design concepts used to insure system quality, reliability, and maintainability.
07.06 Describe the test requirements needed to insure system reliability.
07.07 Define configuration management.
07.08 Describe the implementation of a materials control management system.
07.09 Describe the role of quality assurance in tool engineering.
07.10 Describe and list proper inspection methods.
07.11 Introduce the use of statistical quality control.
07.12 Describe the basic concepts of non-destructive testing.
07.13 Show the interdependence between quality assurance and metrology.
07.14 List the costs of a proper quality control program.
07.15 Show the relationship between quality control, consumerism, and liability.
07.16 Describe the importance of record keeping.
07.17 Explain the basic concepts of a proper management system.

08.0 DEMONSTRATE PROFICIENCY IN MODERN QUALITY ASSURANCE INSPECTION TECHNIQUES--The student will be able to:

08.01 Define the terms used in modern inspection techniques.
08.02 Explain definitions of specifications and tolerances.
08.03 Discuss measurement methods used in the past and present.
08.04 Discuss the inspection methods to be used in the future.
08.05 Describe the purposes of fixed gages.
08.06 Explain the types of fixed gages.
08.07 Discuss the purposes of mechanical indicating devices.
08.08 Explain the types of mechanical indicating devices.
08.09 Discuss the purposes of electrical indicating devices.
08.10 Explain the types of electrical indicating devices.
08.11 Discuss the purposes of optical measurement equipment.
08.12 Explain the types of optical measurement equipment.
08.13 Explain the purpose of a calibration program.

08.14 Discuss the calibration of mechanical devices.
08.15 Discuss the calibration of electrical devices.
08.16 Discuss the calibration of optical devices.
08.17 Explain precision measurements.
08.18 Discuss differences between precision measurements and other measurements.
08.19 Discuss automated and manual measurements.
08.20 Define Nondestructive Testing and uses of NDT in inspection.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Identify documents that may be required when applying for a job.
12.04 Complete a job application form correctly.
12.05 Demonstrate competence in job interview techniques.
12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other persons.
12.07 Identify acceptable work habits.
12.08 Demonstrate knowledge of how to make job changes appropriately.
12.09 Demonstrate acceptable employee health habits.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.
13.05 Identify the necessary personal characteristics of a successful entrepreneur.
13.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Stationary Energy Systems
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I470501**
CIP Number	0647.050100
Grade Level	30, 31
Length	1620 hours
Certification	STA ENGR @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as stationary engineers (95032773), (950.382-026), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and the operation and maintenance of large power sources used for purposes as generating electricity, pumping, and heating and cooling.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Stationary Energy industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in the operation of various types of power plant equipment including stationary engines, boilers, pumps, compressors, motors and generators used to provide heat, refrigeration, power and other utility services in buildings or for industrial processes.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and

tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 9.0, Language 7.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1620 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Perform refrigeration engineer activities.
02.0 Perform stationary engineer duties.
03.0 Perform boiler room duties.
04.0 Detect and correct operational malfunctions.
05.0 Demonstrate appropriate communication skills.
06.0 Demonstrate appropriate math skills.
07.0 Demonstrate appropriate understanding of basic science.
08.0 Demonstrate employability skills.
09.0 Demonstrate an understanding of entrepreneurship.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Stationary Energy Systems
Secondary Number:
Postsecondary Number: I470501

01.0 PERFORM REFRIGERATION ENGINEER ACTIVITIES--The student will be able to:

- 01.01 Operate freon, carbon-dioxide, and ammonia gas cooling systems.
- 01.02 Open valves on equipment.
- 01.03 Start up equipment and auxiliary machinery.
- 01.04 Observe temperature and ampere reading.
- 01.05 Adjust controls to specifications.
- 01.06 Perform override of automatic controls.
- 01.07 Maintain operational logs.
- 01.08 Measure density of brine using hydrometer.
- 01.09 Lower temperature to specified degree.
- 01.10 Connect hoses.
- 01.11 Inspect and maintain equipment.
- 01.12 Operate hand tools.

02.0 PERFORM STATIONARY ENGINEER DUTIES--The student will be able to:

- 02.01 Operate steam engines, air compressors, generators, motors, turbines and steam boilers.
- 02.02 Interpret meters and gauges.
- 02.03 Record operational data for fuel consumption, temperature, levels, gases, load, and balance.
- 02.04 Adjust manual controls as needed.
- 02.05 Operate back-up equipment.
- 02.06 Repack bearings as needed.
- 02.07 Replace gaskets, valves and gauges.
- 02.08 Clean burners and other components.
- 02.09 Use hand and power tools.
- 02.10 Oil and lubricate equipment as needed.
- 02.11 Perform water titration tests as needed.

03.0 PERFORM BOILER ROOM DUTIES--The student will be able to:

- 03.01 Operate fire boilers to generate steam.
- 03.02 Operate torch to light burners.
- 03.03 Grind and fee coal as necessary.
- 03.04 Operate pulverizer and stoker.
- 03.05 Observe pressure and draft meters.
- 03.06 Operate diesel-electric generating unit.
- 03.07 Start diesel engine.
- 03.08 Synchronize generators with other power sources.
- 03.09 Tighten pipes and fittings.
- 03.10 Treat boiler feed water.

04.0 DETECT AND CORRECT OPERATIONAL MALFUNCTIONS--The student will be able to:

- 04.01 Monitor gauges, meters, warning lights and alarms.
- 04.02 Identify function of warning devices.
- 04.03 Make minor adjustments as needed.
- 04.04 Check output efficiency of system.
- 04.05 Verify flow rates as needed.

05.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 05.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 05.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 05.03 Read and follow written and oral instructions.
- 05.04 Answer and ask questions coherently and concisely.
- 05.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 05.06 Demonstrate appropriate telephone/communication skills.

06.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 06.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 06.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 06.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 06.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 06.05 Demonstrate an understanding of federal, state and local taxes and their computation.

07.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 07.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 07.02 Draw conclusions or make inferences from data.
- 07.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 07.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

08.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 08.01 Conduct a job search.

08.02 Secure information about a job.
08.03 Identify documents which may be required when applying for a job interview.
08.04 Complete a job application form correctly.
08.05 Demonstrate competence in job interview techniques.
08.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
08.07 Identify acceptable work habits.
08.08 Demonstrate knowledge of how to make appropriate job changes.
08.09 Demonstrate acceptable employee health habits.
08.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

09.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

09.01 Define entrepreneurship.
09.02 Describe the importance of entrepreneurship to the American economy.
09.03 List the advantages and disadvantages of business ownership.
09.04 Identify the risks involved in ownership of a business.
09.05 Identify the necessary personal characteristics of a successful entrepreneur.
09.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Structural Steel Work
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components	One Occupational Completion Point
	PSAV
Program Number	**I480519**
CIP Number	0646.049900
Grade Level	30, 31
Length	1200 hours
Facility Code	203
VSO	VICA
Co-op Method	Yes
Apprenticeship	Yes
Certification	TEC CONSTR ¶7 ¶G
	BLDG CONST ¶7 ¶G
	STRL STEEL @7 G
	METAL WORK @7 G
Basic Skills	
Math	7
Language	7
Reading	7

I. **PURPOSE:** The purpose of this program is to prepare students for initial employment as a structural steel worker, or to provides supplemental training for persons previously or currently employed in the ironwork and structural steelwork industry.

This program focuses on broad, transferable skills, stresses the understanding of all aspects of the ironwork and structural steelwork industry, and demonstrates such elements of the industry as planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues, and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Classroom, shop, and laboratory activities are an integral part of this program. These activities include training in the general maintenance and safe use of all instructional resources. Equipment and supplies should be provided to enhance hands-on experiences for students in the chosen occupation. A generic equipment list for this program is available.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., (VICA) is the appropriate vocational student organization (VSO) for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

This program is offered in postsecondary adult vocational (PSAV) courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The cooperative method of instruction, on-the-job training (OJT), is appropriate for this program. Whenever the cooperative method is offered, the following are required for each student: (1) a training plan that is signed by the student, teacher, and employer and that includes instructional objectives and a list of on-the-job and in-school learning experiences and (2) a workstation that reflects the equipment, skills, and tasks relevant to the occupation that the student has chosen as a career goal. The student must be paid for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic-skills grade levels required for postsecondary adult vocational students to exit the program are listed before the intended outcomes for the program. These grade-level numbers correspond to grade-equivalent scores obtained on one of the state-designated basic-skills examinations. If a student does not meet the basic-skills level required for completion of the program, remediation should be provided concurrently in the System for Applied Individualized Learning (SAIL) or a remedial lab. Please refer to the Rule for exemptions.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

SCANS Competencies: To accomplish the Secretary's Commission on Achieving Necessary Skills (SCANS) competencies, instructional strategies for this program must include methods that require students to identify, organize, and use resources appropriately; to work with each other cooperatively and productively; to acquire and use information; to understand social, organizational, and technological systems; and to work with a variety of tools and equipment. Instructional strategies must also incorporate methods to improve students' personal qualities and higher-order thinking skills.

IV. **INTENDED OUTCOMES:** After successfully completing the appropriate course(s) for this program, the student will be able to perform the following:

OCCUPATIONAL COMPLETION POINT - DATA CODE A

STRUCTURAL STEEL WORKER - DOT Code 801.361-014

01.0 Apply safety precautions.
02.0 Identify, select, and use tools and equipment.
03.0 Demonstrate appropriate math skills.
04.0 Perform welding operations.
05.0 Demonstrate appropriate communication skills.
06.0 Demonstrate employability skills.
07.0 Erect ornamental iron.

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08.0 Fabricate reinforcing steel.
09.0 Erect structural steel.
10.0 Perform rigging operations.
11.0 Identify access structures.
12.0 Read and interpret blueprints.
13.0 Erect steel fences.
14.0 Apply metal decking and sheeting.
15.0 Identify the proper use of a fiber line.
16.0 Demonstrate positive human-relations skills.
17.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Structural Steel Work
Secondary Number:
Postsecondary Number: I480519

OCCUPATIONAL COMPLETION POINT - DATA CODE A

01.0 APPLY SAFETY PRECAUTIONS--The student will be able to:

- 01.01 Identify the most common causes of accidents to ironworkers.
- 01.02 Discuss the importance of following proper safety precautions in the ironwork industry.
- 01.03 Apply safety procedures and precautions.
- 01.04 Identify health-related problems that may result from exposure to work-related chemicals and hazardous materials, and explain the proper precautions required for handling such materials.
- 01.05 Demonstrate the procedures of basic first-aid and cardiopulmonary resuscitation (CPR).
- 01.06 Explain Occupational Safety and Health Administration (OSHA) and Mining Safety and Health Act (MSHA) rules and regulations.

02.0 IDENTIFY, SELECT, AND USE TOOLS AND EQUIPMENT--The student will be able to:

- 02.01 Identify the tools and equipment used for ironwork.
- 02.02 Select and safely use the tools and equipment needed for a specific job.
- 02.03 Service, maintain, and store tools and equipment.
- 02.04 Use equipment manuals.

03.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 03.01 Solve problems for volume, weight, area, circumference, and perimeter measurements for rectangles, squares, and cylinders.
- 03.02 Measure tolerance(s) on horizontal and vertical surfaces, using centimeters, feet, and inches.

04.0 PERFORM WELDING OPERATIONS--The student will be able to:

- 04.01 Identify the types of welds.
- 04.02 Identify the types of welding machines, rods, and wires.
- 04.03 Demonstrate the practical application of various types of cutting processes.
- 04.04 Demonstrate the practical application of various types of welding procedures on ferrous and nonferrous metals.
- 04.05 Explain the principles of freestanding towers and guy towers and the methods of erecting them.
- 04.06 Explain molecular action as a result of temperature extremes, chemical reaction, and moisture content.

05.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 05.01 Read and follow written instructions and listén to and follow oral instructions.
- 05.02 Read and interpret the graphs, charts, diagrams, and tables commonly used in the industry.
- 05.03 Ask and answer questions coherently and concisely.
- 05.04 Write memos and simple reports.
- 05.05 Complete the forms commonly used in the industry.
- 05.06 Make oral presentations.
- 05.07 Demonstrate appropriate telephone communication skills.

06.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 06.01 Identify advanced-training opportunities.
- 06.02 Secure information about a job.
- 06.03 Identify the documents that may be required for a job application.
- 06.04 Complete a job-application form.
- 06.05 Demonstrate productive work habits and positive attitudes.
- 06.06 Demonstrate a knowledge of how to make job changes properly.
- 06.07 Demonstrate ethical and responsible practices.
- 06.08 Demonstrate acceptable personal hygiene and a professional appearance.
- 06.09 Apply the principles of time management, work simplification, and teamwork when performing assigned tasks.
- 06.10 Demonstrate pride in the quality of work performed.
- 06.11 Describe the importance of a drug-free workplace and industry policies toward drug use.
- 06.12 Describe the importance of a good driving record on employment opportunities.
- 06.13 Describe "Florida's Right-to-Know" Law as recorded in the Florida Statutes, Chapter 442.
- 06.14 Explain the importance of confidentiality in the workplace.

07.0 ERECT ORNAMENTAL IRON--The student will be able to:

- 07.01 Use squares, levels, transits, rulers, and other tools for preparing layout work.
- 07.02 Identify various types of doors and frames that are used in ironworking.
- 07.03 Erect doors and frames.
- 07.04 Identify different types of:
  - a. gratings
  - b. grills
  - c. handrails
  - d. stairways
  - e. rails
- 07.05 Install different types of:
  - a. gratings
  - b. grills
  - c. handrails
  - d. stairways

e. rails

08.0 FABRICATE REINFORCING STEEL--The student will be able to:

08.01 Fabricate reinforcing steel, using various math formulas.
08.02 Erect, place, and tie reinforcing steel, applying math functions.

09.0 ERECT STRUCTURAL STEEL--The student will be able to:

09.01 Identify various connections of beams, columns, and any other structural members.
09.02 Execute connections of beams, columns, and other structural members.
09.03 Demonstrate the proper method of hooking steel beams and columns for hoisting in a building erection.
09.04 Demonstrate the correct hand signals for all cranes, derricks, and gin poles.
09.05 Identify various types of cranes, derricks, and gin poles.
09.06 Identify the types of splices used for all phases of wire rope.
09.07 Demonstrate the different types of splicing for wire rope.
09.08 Explain the principles of freestanding towers and guy towers and the methods of erecting them.

10.0 PERFORM RIGGING OPERATIONS--The student will be able to:

10.01 Explain pressure measurement in terms of pounds per square inch (PSI) and inches of mercury.
10.02 Identify rigging hardware and its proper uses.
10.03 Describe and perform rigging applications.
10.04 Identify different types of blocks and their safe working load.
10.05 Compute the mechanical advantages of compound tackle systems.
10.06 Reeve and lace wire rope through the blocks and sheaves.
10.07 Identify the types of slings and their uses.
10.08 Identify the center of gravity and picking points for heavy loads.
10.09 Identify the methods of hoisting heavy loads correctly into place.

11.0 IDENTIFY ACCESS STRUCTURES--The student will be able to:

11.01 Identify access structures, such as stairwells, platforms, and ladders.
11.02 Identify the methods of rigging access structures.

12.0 READ AND INTERPRET BLUEPRINTS--The student will be able to:

12.01 Identify and interpret the different types of blueprints.
12.02 Identify and interpret blueprint symbols, abbreviations, markings, and details.
12.03 Identify and interpret control and measurement lines.
12.04 Translate a blueprint into practical use.
12.05 Draw conclusions or make inferences from data.

13.0 ERECT STEEL FENCES--The student will be able to:

13.01 Lay out steel fences.
13.02 Erect steel fences.

14.0 APPLY METAL DECKING AND SHEETING--The student will be able to:

14.01 Identify the various types of metal decking and sheeting.
14.02 Describe the proper handling and placing of metal decking sheeting.
14.03 Apply proper placement or erection techniques for metal decking and sheeting.

15.0 IDENTIFY THE PROPER USE OF A FIBER LINE--The student will be able to:

15.01 Identify the different types of fiber line.
15.02 Explain the effects of climate on fiber line.
15.03 Identify various types of knots, their uses, and the advantages and disadvantages of each.
15.04 Make various splices, knots, bends, and hitches.

16.0 DEMONSTRATE POSITIVE HUMAN-RELATIONS SKILLS--The student will be able to:

16.01 Exercise self-control.
16.02 Identify and demonstrate appropriate responses to criticism and praise.
16.03 Explain the effects of positive human-relations skills on success in the industry.
16.04 Demonstrate respect for people and property.

17.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

17.01 Define "entrepreneurship."
17.02 Describe the importance of entrepreneurship to the American economy.
17.03 List the advantages and disadvantages of business ownership.
17.04 Identify the risks involved in the ownership of a business.
17.05 Identify the personal characteristics of a successful entrepreneur.
17.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Surveying and Mapping Technology
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I150203**
CIP Number	0615.020300
Grade Level	30, 31
Length	1980 hours
Certification	TEC CONSTR ¶7 ¶G
	SURVEY @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as a surveying and mapping technician (22521073), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, record keeping skills and mathematics, and use of surveying equipment to perform measurement activities.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Surveying and Mapping industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in chaining, rod and level activities, angle measurement, electronic distance measurement, land surveying and construction layout.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 9.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1980 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Measure land using chains and tape.
02.0 Perform rod and level activities.
03.0 Perform angle measurement activities.
04.0 Perform electronic distance measurement activities.
05.0 Perform land surveying activities.
06.0 Perform construction stake out activities.
07.0 Perform supervisory functions.
08.0 Determine methods and procedures for establishing survey control.
09.0 Develop sketches and drawings.
10.0 Research previous survey evidence.
11.0 Compute volumes and areas.
12.0 Read, interpret, and write descriptions of land.
13.0 Prepare charts and tables.
14.0 Demonstrate appropriate communication skills.
15.0 Demonstrate appropriate math skills.
16.0 Demonstrate appropriate understanding of basic science.
17.0 Demonstrate employability skills.
18.0 Demonstrate an understanding of entrepreneurship.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Surveying And Mapping Technology
Secondary Number:
Postsecondary Number: I150203

01.0 MEASURE LAND USING CHAINS AND TAPE--The student will be able to:

- 01.01 Clear brush to establish line of sight.
- 01.02 Hold the chain/tape over a point.
- 01.03 Pull the chain/tape.
- 01.04 Wind the chain/tape on reel.
- 01.05 Set the marker.
- 01.06 Loop and throw the unreeled chain/tape.
- 01.07 Establish a line perpendicular to an existing line at a given point using a right angle prism.
- 01.08 Establish elevation using a hand (Locke) level.
- 01.09 Test and standardize the chain/tape.

02.0 PERFORM ROD AND LEVEL ACTIVITIES--The student will be able to:

- 02.01 Plumb the rod.
- 02.02 Obtain a rod reading using a target.
- 02.03 Obtain a rod reading with using a target.
- 02.04 Establish a turning point/benchmark.
- 02.05 Set up the level.
- 02.06 Test the level.

03.0 PERFORM ANGLE MEASUREMENT ACTIVITIES--The student will be able to:

- 03.01 Set up a transit/theodolite over a point.
- 03.02 Measure a horizontal angle.
- 03.03 Measure a vertical angle.
- 03.04 Lay out a horizontal angle.
- 03.05 Lay out a vertical angle.
- 03.06 Read a compass bearing.
- 03.07 Adjust transit/theodolite leveling bubbles.
- 03.08 Adjust transit/theodolite vertical cross-hair by double centering.
- 03.09 Adjust transit/theodolite vertical cross-hair for vertical accuracy.

04.0 PERFORM ELECTRONIC DISTANCE MEASUREMENT ACTIVITIES--The student will be able to:

- 04.01 Test accuracy of instrument against a known point.
- 04.02 Set up EDM.
- 04.03 Obtain scope distance and compute horizontal distance.
- 04.04 Set up reflector.

05.0 PERFORM LAND SURVEYING ACTIVITIES--The student will be able to:

05.01 Determine horizontal distance by the stadia method.
05.02 Determine elevation by the stadia method.
05.03 Locate detail be angle and distance using a transit/theodolite.
05.04 Locate detail by the use of a plane table and alidade.
05.05 Establish property corners from deed descriptions or plat.
05.06 Secure a deed from the courthouse.

06.0 PERFORM CONSTRUCTION STAKE OUT ACTIVITIES--The student will be able to:

06.01 Establish horizontal control.
06.02 Establish vertical control.
06.03 Stake out horizontal curves.
06.04 Determine elevations for vertical curves.
06.05 Establish slope stakes.

07.0 PERFORM SUPERVISORY FUNCTIONS--The student will be able to:

07.01 Demonstrate equipment use.
07.02 Inventory field supplies and equipment.
07.03 Select equipment.
07.04 Evaluate personnel
07.05 Schedule work.
07.06 Perform mathematical checks on field work.
07.07 Keep field notes.

08.0 DETERMINE METHODS AND PROCEDURES FOR ESTABLISHING SURVEY CONTROL--The student will be able to:

08.01 Understand and apply methods of distance measurements.
08.02 Understand and apply methods of angle measurements.
08.03 Understand and apply azimuth determination.
08.04 Understand and apply closure computations.
08.05 Understand and apply adjustment of data.

09.0 DEVELOP SKETCHES AND DRAWINGS--The student will be able to:

09.01 Make lettering sketches to identify items.
09.02 Demonstrate inking procedures.
09.03 Identify map symbolism.
09.04 Define and interpret dimensioning.
09.05 Write a brief but adequate property description.

10.0 RESEARCH PREVIOUS SURVEY EVIDENCE--The student will be able to:

10.01 Be familiar with courthouse procedures.
10.02 Conduct a title search.
10.03 Demonstrate an understanding of deeds.
10.04 Search for record evidence.
10.05 Demonstrate proper resurvey processes.

11.0 COMPUTE VOLUMES AND AREAS--The student will be able to:

11.01 Compute an area by using trapezoids
11.02 Compute an area by using coordinates.

11.03 Compute an area of a curved surface.
11.04 Compute volumes of linear dimension surfaces.
11.05 Compute volumes of curved surfaces.

12.0 READ, INTERPRET, AND WRITE DESCRIPTIONS OF LAND--The student will be able to:

12.01 Prepare metes and bounds descriptions.
12.02 Understand the U.S. Public Land Survey System.
12.03 Understand and interpret sectionalized surveys.
12.04 Understand and interpret sectional breakdowns.
12.05 Understand and interpret standard deed information.

13.0 PREPARE CHARTS AND TABLES--The student will be able to:

13.01 Understand and prepare curve information.
13.02 Understand and prepare highway design information.
13.03 Understand and prepare standard control information.
13.04 Understand and prepare proper field notes.
13.05 Understand and prepare proper legend information.

14.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

14.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
14.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
14.03 Read and follow written and oral instructions.
14.04 Answer and ask questions coherently and concisely.
14.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
14.06 Demonstrate appropriate telephone/communication skills.

15.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

15.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
15.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
15.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
15.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
15.05 Demonstrate an understanding of federal, state and local taxes and their computation.

16.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

16.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
16.02 Draw conclusions or make inferences from data.

16.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

16.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

17.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

17.01 Conduct a job search.

17.02 Secure information about a job.

17.03 Identify documents which may be required when applying for a job interview.

17.04 Complete a job application form correctly.

17.05 Demonstrate competence in job interview techniques.

17.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

17.07 Identify acceptable work habits.

17.08 Demonstrate knowledge of how to make appropriate job changes.

17.09 Demonstrate acceptable employee health habits.

17.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

18.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

18.01 Define entrepreneurship.

18.02 Describe the importance of entrepreneurship tc the American economy.

18.03 List the advantages and disadvantages of business ownership.

18.04 Identify the risks involved in ownership of a business.

18.05 Identify the necessary personal characteristics of a successful entrepreneur.

18.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Swimming Pool Maintenance
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	N/A
	PSAV
Program Numbers:	**I469939**
CIP Number	0646.999903
Grade Level	30, 31
Length	450 Hours
Certification	POOL MAINT @7 G
Facility Code	244
VSO	VICA
Coop Method	Yes
Apprenticeship	No

I. **PURPOSE:** The purpose of this program is to prepare students for initial employment as a swimming pool servicer (891.684-018), or to provide supplemental training for persons previously or currently employed in this occupational area.

The content should include, but not be limited to, the safety storage, and handling of pool maintenance tools, equipment, and supplies; disease and Florida State Board of Health regulations; pool circulation and recirculation equipment; filters and filtration; required mathematics for swimming pool calculations; acid/base chemistry; alkalinity and hardness; water sanitizing and control agents; chlorinators and the chemistry of chlorination; bactericides stabilizers and other pool chemicals; water testing; swimming pool and spa maintenance; spas, hot tubs, and therapy pools; pool, spa, hot tub, and therapy pool problems; pool management and operation; energy conservation, management, and solar energy; occupational information; entrepreneurship; and employability skills.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the pool maintenance industry; planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Instruction is provided in a realistic setting using hands-on experiences with the tools, equipment, and materials appropriate to the program content and in accordance with current practices in industry and governmental regulations.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such

organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

This program may be offered to meet the needs of local employers and licensing requirements. A minimum of 40 classroom hours is usually required.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 8.0, Language 7.0, Reading 7.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 450 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A

SWIMMING POOL SERVICER - DOT Code 891.684-018

01.0 Demonstrate the safe storage and use of pool and spa tools, equipment, and supplies.
02.0 Identify pool and spa related diseases and their prevention.
03.0 Identify and understand Florida State Board of Health (SBOH) regulations related to pool and spas.
04.0 Identify the major components of a circulation system and their general construction, function, and proper circulation in a pool.
05.0 Identify major types of filters, along with their construction and the function of their components.
06.0 Demonstrate competency in the mathematical operations required in swimming pool calculations.
07.0 Identify the characteristics of acid/base and other chemical interactions in water and their identification in chemical terms.
08.0 Identify alkalinity and "hardness" in water.
09.0 Identify the types and characteristics of chlorinators.
10.0 Identify the characteristics and the chemistry of chlorine in relation to swimming pools.
11.0 Identify the characteristics of bactericides and stabilizers.
12.0 Perform water tests.

13.0 Identify other pool chemicals along with their functions and applications.

14.0 Perform swimming pool maintenance.

15.0 Perform special maintenance for spas, hot tubs, and therapy pools.

16.0 Identify common problems and appropriate solutions for pools, spas, hot tubs, and therapy pools.

17.0 Identify correct principles of energy conservation and management, including the use of solar energy.

18.0 Identify common occupations found in the swimming pool and spa industry, along with their occupational requirements and availability, and the possibilities of owning a business in the industry.

19.0 Demonstrate appropriate communication skills.

20.0 Demonstrate appropriate math skills.

21.0 Demonstrate appropriate understanding of basic science.

22.0 Demonstrate employability skills.

23.0 Demonstrate an understanding of entrepreneurship.

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July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Swimming Pool Maintenance
Secondary Number:
Postsecondary Number: I469939

OCCUPATIONAL COMPLETION POINT - DATA CODE A
SWIMMING POOL SERVICER - DOT Code 891.684-018

01.0 DEMONSTRATE THE SAFE STORAGE AND USE OF POOL AND SPA TOOLS, EQUIPMENT, AND SUPPLIES--The student will be able to:

- 01.01 Identify swimming pool maintenance tools and equipment by name and function.
- 01.02 Demonstrate proper and safe handling of tools, equipment, and supplies so as to protect the user and others from fire, electrical shock, and other injuries.
- 01.03 Identify possible injury which can be caused by improper storage or use of pool/spa chemicals and other materials.
- 01.04 Demonstrate proper care and storage and use of pool/spa supplies.

02.0 IDENTIFY POOL- AND SPA-RELATED DISEASES AND THEIR PREVENTION--The student will be able to:

- 02.01 Identify pool/spa conditions which may cause disease.
- 02.02 Select appropriate remedies for pool/spa conditions which might cause diseases.

03.0 IDENTIFY AND UNDERSTAND FLORIDA STATE BOARD OF HEALTH (SBOH) REGULATIONS RELATED TO POOLS AND SPAS--The student will be able to:

- 03.01 Apply SBOH regulations governing water quality in public pools.
- 03.02 Apply SBOH requirements for recirculation; piping and hydraulics; filters; chemical feeders; hydrotherapy, whirlpools, spas, and wading pools; diving areas; lighting; bathing load; and spectators related to public pools.
- 03.03 Identify the function of an inspection by the Health Department and the consequences of noncompliance.

04.0 IDENTIFY THE MAJOR COMPONENTS OF A CIRCULATION SYSTEM AND THEIR GENERAL CONSTRUCTION, FUNCTION, AND PROPER CIRCULATION IN A POOL--The student will be able to:

- 04.01 Identify the major components of a standard circulation system and the function of each component.
- 04.02 Identify the major subcomponents (of each component) in a standard circulation system and the purpose of each.
- 04.03 Identify the function of each of the following pieces of recirculation equipment: flow rate meter and bypass; gauges; valves; surge tanks; and hair and lint strainers.
- 04.04 Identify proper circulation in a swimming pool.

04.05 Identify a centrifugal pump and curve.

05.0 IDENTIFY MAJOR TYPES OF FILTERS, ALONG WITH THEIR CONSTRUCTION AND THE FUNCTION OF THEIR COMPONENTS--The student will be able to:

05.01 Identify and describe the unique characteristics of sand, diatomaceous earth, and cartridge filters.
05.02 Identify the significance of gravity, rapid flow, and high rate in a sand filter.
05.03 Identify the significance of pressure and a vacuum in a diatomaceous earth filter.

06.0 DEMONSTRATE COMPETENCY IN MATHEMATICAL OPERATIONS REQUIRED IN SWIMMING POOL CALCULATIONS--The student will be able to:

06.01 Calculate the volume of water.
06.02 Calculate filter surface area.
06.03 Calculate pool capacity.
06.04 Calculate turnover rate.
06.05 Calculate flow rate and convert to gallons per minute.
06.06 Calculate swimmer load.
06.07 Calculate pool leaks and make-up water.
06.08 Calculate chemical dosage.
06.09 Calculate temperature conversion.

07.0 IDENTIFY THE CHARACTERISTIC OF ACID/BASE AND OTHER CHEMICAL INTERACTIONS IN WATER AND THEIR IDENTIFICATION IN CHEMICAL TERMS--The student will be able to:

07.01 Identify the concept pH in terms of acids and bases present in water.
07.02 Identify the proper procedure for controlling the balance between acids and bases in water.
07.03 Identify the relationship of chlorine and pH in water.
07.04 Identify corrosion, state how it occurs, and list the varieties of corrosion and galvanic series.
07.05 Demonstrate methods to prevent or retard corrosion.

08.0 IDENTIFY ALKALINITY AND "HARDNESS" IN WATER--The student will be able to:

08.01 Identify alkalinity in pool water.
08.02 Identify permanent and temporary alkalinity.
08.03 Demonstrate procedures for control of total alkalinity.

09.0 IDENTIFY THE TYPES OF CHARACTERISTICS OF CHLORINATORS--The student will be able to:

09.01 Identify the distinguishing characteristics of a hypochlorinator.
09.02 Identify the distinguishing characteristics of a gas chlorinator.
09.03 Identify the distinguishing characteristics of an erosion feed chlorinator.

10.0 IDENTIFY THE CHARACTERISTICS AND THE CHEMISTRY OF CHLORINE IN RELATION TO SWIMMING POOLS--The student will be able to:

10.01 Identify the products of chlorine combined with other substances in pool water.
10.02 Identify residual chlorine in pool water.
10.03 Identify the characteristics of solution chlorine.
10.04 Identify the characteristics of chlorine in the form of a gas.
10.05 Identify the characteristics of chlorine in powder form.
10.06 Identify the distinguishing characteristics of chloramines.
10.07 Identify the effects of the sun on chlorine in pool water.

11.0 IDENTIFY THE CHARACTERISTICS OF BACTERICIDES AND STABILIZERS--The student will be able to:

11.01 Identify the effects of bromine and bromides and the chemical interactions with other substances in pool water.
11.02 Identify the effects of iodine and the chemical interactions with other substances in pool water.
11.03 Identify other commonly used methods of sanitation.

12.0 PERFORM WATER TESTS--The student will be able to:

12.01 Identify commonly used water test kits and their distinguishing characteristics.
12.02 Test for free chlorine and take appropriate action.
12.03 Conduct the cyanuric test and take appropriate action.
12.04 Test for total alkalinity and take appropriate action.
12.05 Conduct other commonly used water tests.

13.0 IDENTIFY OTHER POOL CHEMICALS, ALONG WITH THEIR FUNCTIONS AND APPLICATIONS--The student will be able to:

13.01 Identify commonly used algaecides and their functions.
13.02 Demonstrate proper procedures for applying algaecides.
13.03 Identify commonly used flocculents and their functions.
13.04 Demonstrate proper procedures for applying flocculents.
13.05 Identify common sequestering agents and their functions.
13.06 Demonstrate the proper procedure for applying sequestering agents.

14.0 PERFORM SWIMMING POOL MAINTENANCE--The student will be able to:

14.01 Inspect and clean pool surface.
14.02 Inspect and clean or repair a pool deck.
14.03 Inspect and clean or repair water barriers.
14.04 Inspect and clean or repair pool walls, troughs, and skimmers.
14.05 Inspect and clean or repair a pool bottom.
14.06 Inspect and clean/repair or replace a diving board and slide.
14.07 Inspect and clean or repair lights.
14.08 Inspect and service a filter pump.
14.09 Inspect, remove, and replace motors.
14.10 Inspect and clean or repair a hair and lint strainer.

14.11 Inspect and replace pressure gauges.
14.12 Inspect and service, clean, or repair a chemical feeder.
14.13 Inspect and service or repair gas and other chlorinators.
14.14 Inspect and service or repair a water heater.
14.15 Inspect and clean or repair a valve.

15.0 PERFORM SPECIAL MAINTENANCE FOR SPAS, HOT TUBS, AND THERAPY POOLS--The student will be able to:

15.01 Identify and control bacterial growth, including pseudomona aeruginosa.
15.02 Measure and adjust the chlorine level.
15.03 Inspect and adjust circulation.
15.04 Identify hyperthermia and preventive action with timer.
15.05 Identify and correct hair entrapment and entanglement.
15.06 Install appropriate warning and safety signs.
15.07 Select appropriate heater size.
15.08 Demonstrate appropriate record keeping.

16.0 IDENTIFY COMMON PROBLEMS AND APPROPRIATE SOLUTIONS FOR POOLS, SPAS, HOT TUBS, AND THERAPY POOLS--The student will be able to:

16.01 Identify and correct common hydraulic problems.
16.02 Identify and correct common electrical problems.
16.03 Identify and correct common mechanical problems.
16.04 Identify and correct common temperature problems.
16.05 Identify and correct common humidity problems.
16.06 Identify and correct common pool shell problems.
16.07 Identify and correct common water clarity problems.
16.08 Identify and correct common pool water problems.
16.09 Identify and correct common filter problems.

17.0 IDENTIFY CORRECT PRINCIPLES OF ENERGY CONSERVATION AND MANAGEMENT, INCLUDING THE USE OF SOLAR ENERGY--The student will be able to:

17.01 Identify types and factors affecting heat loss.
17.02 Identify appropriate situations for the use of a pool blanket.
17.03 Identify and perform appropriate procedures for conserving energy through circulation, filtration, lighting, heating, pool shelters, and using the swimming season.
17.04 Identify and install appropriate solar collectors.

18.0 IDENTIFY COMMON OCCUPATIONS FOUND IN THE SWIMMING POOL AND SPA INDUSTRY, ALONG WITH THEIR OCCUPATIONAL REQUIREMENTS AND AVAILABILITY, AND THE POSSIBILITIES OF OWNING A BUSINESS IN THE INDUSTRY--The student will be able to:

18.01 Identify the requirements and availability of certified swimming pool and spa maintenance contractor jobs.
18.02 Identify the requirements for going into business as a certified swimming pool maintenance contractor.
18.03 Identify the requirements for being certified (at municipal, county, and/or state level(s) as a pool operator.

19.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

19.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
19.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
19.03 Read and follow written and oral instructions.
19.04 Answer and ask questions coherently and concisely.
19.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
19.06 Demonstrate appropriate telephone/communication skills.

20.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

20.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
20.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
20.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
20.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
20.05 Demonstrate an understanding of federal, state and local taxes and their computation.

21.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

21.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
21.02 Draw conclusions or make inferences from data.
21.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
21.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

22.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

22.01 Conduct a job search.
22.02 Secure information about a job.
22.03 Identify documents which may be required when applying for a job interview.
22.04 Complete a job application form correctly.
22.05 Demonstrate competence in job interview techniques.
22.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
22.07 Identify acceptable work habits.
22.08 Demonstrate knowledge of how to make job changes appropriately.
22.09 Demonstrate acceptable employee health habits.
22.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

23.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEUPSHIP--The student will be able to:

23.01 Define entrepreneurship.
23.02 Describe the importance of entrepreneurship to the American economy.
23.03 List the advantages and disadvantages of business ownership.
23.04 Identify the risks involved in ownership of a business.
23.05 Identify the necessary personal characteristics of a successful entrepreneur.
23.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Technical Writing - Publications Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0623.110100
Grade Level	College Credits
Length	AS Degree

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for initial employment with occupational titles as technical publications writers (34005195), (131.267-016), or to provide supplemental training for persons previously or currently employed in these occupations.

The content should include, but not be limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and revising, editing, and writing materials for technical and administrative publications concerned with work methods and procedures, and installation, operation, and maintenance of machinery and other equipment.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Technical Writing - Publications industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in developing technically oriented materials through interpretation of processes, blueprints, interviews, and notes. Activities include preparing final script and supporting illustrations to be printed.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has

chosen as a career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate understanding of procedures.
02.0 Develop and write material.
03.0 Edit technical material.
04.0 Perform research.
05.0 Interpret blueprints and schematics.
06.0 Revise printed materials.
07.0 Lay out work to be printed.
08.0 Demonstrate appropriate communication skills.
09.0 Demonstrate appropriate math skills.
10.0 Demonstrate appropriate understanding of basic science.
11.0 Demonstrate employability skills.
12.0 Demonstrate an understanding of entrepreneurship.

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Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Technical Writing - Publications Technology
Secondary Number:
Postsecondary Number: 0623.110100

01.0 DEMONSTRATE UNDERSTANDING OF PROCEDURES--The student will be able to:

- 01.01 Apply school and class rules and procedures.
- 01.02 Apply rules and procedures used in business and industry for the occupation.

02.0 DEVELOP AND WRITE MATERIALS--The student will be able to:

- 02.01 Apply rules of grammar and word usage.
- 02.02 Use sentences and paragraphs effectively.
- 02.03 Spell words correctly.
- 02.04 Write paragraphs exemplifying the qualities of unity and coherence, and using emphasis effectively.
- 02.05 Identify the need for a publication.
- 02.06 Define the audience to read a publication.
- 02.07 Select and rank the topics as appropriate.
- 02.08 Define the scope of the publication.
- 02.09 Develop the time frame for development.
- 02.10 Prepare a budget as necessary.
- 02.11 Apply standards.
- 02.12 Review existing literature.
- 02.13 Determine and consider resources.
- 02.14 Coordinate the project by maintaining monitoring, and reporting progress.
- 02.15 Schedule editorial and support services.
- 02.16 Choose vendors.
- 02.17 Receive and file source data.
- 02.18 Develop, revise, and edit drafts.
- 02.19 Group information into working units.
- 02.20 Prepare and revise an outline.
- 02.21 Utilize word processing system.
- 02.22 Develop a format for a publication.
- 02.23 Define and standardize terminology.
- 02.24 Comply with standards and specifications.
- 02.25 Match the level of vocabulary with the targeted audience.
- 02.26 Make notes for illustrations.
- 02.27 Specify types and styles for illustrations.
- 02.28 Prepare sketches as needed.
- 02.29 Write figures titles and photograph captions.
- 02.30 Prepare tables and charts.
- 02.31 Provide artists with source data.

03.0 EDIT TECHNICAL MATERIAL--The student will be able to:

- 03.01 Evaluate material for readability and correctness.
- 03.02 Validate the data.

03.03 Validate the data in illustrations.
03.04 Review and edit illustrations.
03.05 Conduct meetings for feedback, conflict resolution, and evaluation of suggested changes.

04.0 PERFORM RESEARCH--The student will be able to:

04.01 Interview sources of information.
04.02 Study relevant literature.
04.03 Participate hands-on experiences, if applicable.
04.04 Observe or walk through the process(es).
04.05 Use and evaluate models.
04.06 Simulate audience's situation.

05.0 INTERPRET BLUEPRINTS AND SCHEMATICS--The student will be able to:

05.01 Apply math skills.
05.02 Read scales and measuring instruments.
05.03 Read and interpret multiview drawings.
05.04 Read and interpret section views and details.
05.05 Read and interpret auxiliary views.
05.06 Read and interpret types of dimensions.
05.07 Read and interpret pictorial drawings.
05.08 Read and interpret supplementary information.
05.09 Read and interpret removable fastener drawings.
05.10 Read and interpret welding drawings.
05.11 Read and interpret geometric tolerances.
05.12 Read and interpret cam drawings.
05.13 Read and interpret gear drawings.
05.14 Read and interpret assembly and subassembly drawings.
05.15 Read and interpret detail drawings.
05.16 Read and interpret surface developments.
05.17 Read and interpret bearing drawings.
05.18 Read and interpret spring drawings.
05.19 Read and interpret casting drawings.
05.20 Read and interpret forging drawings.
05.21 Read and interpret tool drawings.
05.22 Read and interpret stamping drawings.
05.23 Read and interpret numerical control drawings.
05.24 Read and interpret computer aided drawings.
05.25 Read and interpret plot plans.
05.26 Read and interpret foundation plan drawings.
05.27 Read and interpret floor plan drawings.
05.28 Read and interpret elevation drawings.
05.29 Read and interpret schedules.
05.30 Read and interpret stair details.
05.31 Read and interpret fireplace details.
05.32 Read and interpret truss drawings.
05.33 Read and interpret roof framing plans.
05.34 Read and interpret electrical plans.
05.35 Read and interpret plumbing drawings.
05.36 Read and interpret heating/cooling plans.
05.37 Read and interpret landscape layout drawings.
05.38 Read and interpret specifications.

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05.39 Read and interpret erection plans.
05.40 Read and interpret structural steel design drawings.
05.41 Read and interpret structural steel drawings.
05.42 Read and interpret concrete engineering drawings.
05.43 Read and interpret placing drawings.
05.44 Read and interpret schematic drawings.
05.45 Read and interpret printed circuit board drawings.
05.46 Read and interpret package drawings.
05.47 Read and interpret connection drawings.
05.48 Read and interpret interconnection drawings.
05.49 Read and interpret wiring lists.
05.50 Read and interpret cable drawings.
05.51 Read and interpret harness drawings.
05.52 Read and interpret component drawings.
05.53 Read and interpret logic diagrams.
05.54 Read and interpret block diagrams.
05.55 Read and interpret cutaway diagrams.
05.56 Read and interpret graphic diagrams.
05.57 Read and interpret combination diagrams.
05.58 Read and interpret traverse drawings.
05.59 Read and interpret plat drawings.
05.60 Read and interpret street layout drawings.
05.61 Read and interpret map drawings.
05.62 Read and interpret topographic drawings.
05.63 Identify construction codes and standards.
05.64 Identify mechanical standards.
05.65 Identify electronic standards.

06.0 REVISE PRINTED MATERIALS--The student will be able to:

06.01 Determine the requirements of the job.
06.02 Estimate the time to complete the job.
06.03 Calculate costs.
06.04 Make changes and rewrite the draft in the required format.

07.0 LAY OUT WORK TO BE PRINTED--The student will be able to:

07.01 Specify typography.
07.02 Prepare dummy copy.
07.03 Paginate the text.
07.04 Paste-up camera-ready copy.
07.05 Make photostats of art (i.e., PMT, velox, photostat).
07.06 Crop and size illustrations.
07.07 Strip and opaque negatives.
07.08 Proofread copy at each stage of production.
07.09 Secure final approvals.
07.10 Prepare a printer's dummy or approval copy.
07.11 Secure estimates from printers.
07.12 Evaluate estimates and prepare a contract.
07.13 Send camera-ready copy to the printer.
07.14 Secure and inspect negatives.
07.15 Inspect printer's work (bluelines, press proofs, or first page).
07.16 Solve problems with the printer.

07.17 Receive, check, and approve for payment the shipment from a printer.

07.18 Coordinate the distribution of print material.

08.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

08.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.

08.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.

08.03 Read and follow written and oral instructions.

08.04 Answer and ask questions coherently and concisely.

08.05 Read critically by recognizing assumptions and implications and by evaluating ideas.

08.06 Demonstrate appropriate telephone/communication skills.

09.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

09.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

09.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

09.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

09.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

09.05 Demonstrate an understanding of federal, state and local taxes and their computation.

10.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

10.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

10.02 Draw conclusions or make inferences from data.

10.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

10.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

11.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

11.01 Conduct a job search.

11.02 Secure information about a job.

11.03 Identify documents which may be required when applying for a job interview.

11.04 Complete a job application form correctly.

11.05 Demonstrate competence in job interview techniques.

11.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

11.07 Identify acceptable work habits.

11.08 Demonstrate knowledge of how to make job changes appropriately.
11.09 Demonstrate acceptable employee health habits.
11.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

12.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

12.01 Define entrepreneurship.
12.02 Describe the importance of entrepreneurship to the American economy.
12.03 List the advantages and disadvantages of business ownership.
12.04 Identify the risks involved in ownership of a business.
12.05 Identify the necessary personal characteristics of a successful entrepreneur.
12.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Telecommunication Engineering Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.030302
Grade Level	College Credits
Length	AS Degree

I. **MAJOR CONCEPTS/CONTENT:** This program is designed to prepare students for employment as communications engineering technicians or in related occupations, or to provide supplemental training to persons previously or currently employed in these occupations.

Electronic Technology and/or Electronic Engineering Technology (CORE) are prerequisites for entry into this electronic specialization program. The CORE program prepares individuals to assemble, install, operate, maintain, troubleshoot and repair electronic equipment used in industry. In addition, it also includes content related to the design, theory, and analysis of electronic systems and applications.

This specialization content includes, but is not limited to, amplitude and angle modulation systems, transmission lines, antennas, fiber optic systems, digital communications and data communications.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Telecommunication Engineering industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Electronic laboratory activities are an integral part of this program. The tools, test equipment, materials and processes used in this laboratory are similar to those used in industry. Students should be able to use the various types of precision test equipment found in general use throughout the electronics industry for the purpose of analyzing, troubleshooting and repairing electronic circuitry.

III. **SPECIAL NOTE:** As part of an Associate in Science Degree, there is a major component of general education requirements which allows the student to more easily relate the technical knowledge gained to a theoretical level and to allow for greater knowledge expansion and transference in the future.

This general education requirement must have a minimum of 15 semester hours with at least one course in oral and written communication and one course in computational skills. The computational skills should include algebra and trigonometry.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The cooperative method of instruction may be utilized for this program. When the cooperative method is offered, the following is required for each student: a training plan signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; and a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

When content from the Florida common core electronics program (Electronics Technology) is included, the typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Demonstrate proficiency in design and analysis of AM transmitters and receivers.
02.0 Demonstrate proficiency in design and analysis of FM transmitters and receivers.
03.0 Demonstrate proficiency in the analysis of transmission line systems and antennas.
04.0 Demonstrate proficiency in the analysis of fiber-optic systems.
05.0 Demonstrate proficiency in the analysis of digital communication systems.
06.0 Demonstrate proficiency in the analysis of data communications.
07.0 Demonstrate proficiency in the analysis of satellite communication systems.
08.0 Demonstrate proficiency in the analysis of video systems.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Telecommunication Engineering Technology
Secondary Number:
Postsecondary Number: 0615.030302

01.0 DEMONSTRATE PROFICIENCY IN DESIGN AND ANALYSIS OF AM TRANSMITTERS AND RECEIVERS--The student will be able to:

- 01.01 Describe the operation of amplitude modulation (AM) radio systems.
- 01.02 Identify the stages of AM transmitters and receivers.
- 01.03 Define the principles of amplitude modulation.
- 01.04 Design, analyze and troubleshoot AM transmitter/receiver circuits including mixers, IF amplifiers, local oscillators, modulators, demodulators and speech amplifiers.
- 01.05 Align Intermediate Frequency (IF) circuits.
- 01.06 Measure the receiver IF bandwidth.
- 01.07 Measure the sensitivity of a receiver.
- 01.08 Measure the signal to noise ratio of a receiver.
- 01.09 Conduct operating system checks of AM transmitters and receivers.
- 01.10 Analyze AM radio circuits.
- 01.11 Measure AM signals using appropriate test equipment.
- 01.12 Design, analyze, troubleshoot and adjust AM hetrodyning, frequency synthesis, phase-locked-loop, filtering and automatic control circuits.
- 01.13 Analyze, troubleshoot and adjust RF power amplifier circuits.
- 01.14 Describe the operation of Double Side Band (DSB) and Single Side Band (SSB) radio systems.
- 01.15 Identify the stages of SSB and DSB transmitter and receiver circuits.
- 01.16 Design, analyze and troubleshoot SSB and DSB transmitter and receiver circuits.
- 01.17 Conduct operating system checks and make minor adjustments to SSB and DSB transmitters and receivers.
- 01.18 Analyze and test AM, SSB and DSB radio circuits using spectrum analyzers, noise analyzers, impedance meters, sweep generators, distortion meters and power meters.

02.0 DEMONSTRATE PROFICIENCY IN DESIGN AND ANALYSIS OF FM TRANSMITTERS AND RECEIVERS--The student will be able to:

- 02.01 Describe the operation of FM radio systems.
- 02.02 Identify the stages of FM transmitter and receiver systems.
- 02.03 Describe the principles of operation of frequency modulation.
- 02.04 Design, analyze and troubleshoot FM transmitter and receiver circuits.
- 02.05 Align and measure the bandwidth of IF amplifier circuits.
- 02.06 Measure the receiver input sensitivity.
- 02.07 Conduct an operating systems check of FM transmitters and receivers.

02.08 Design, analyze, adjust and troubleshoot FM stereo transmitter and receiver circuits.

02.09 Design, analyze, adjust and troubleshoot digital tuning circuits.

02.10 Design, analyze, adjust and troubleshoot phase modulation (PM) circuits.

02.11 Design, analyze, adjust and troubleshoot FM transceiver circuits.

02.12 Test, adjust and align FM and PM transmitters and receivers using the spectrum analyzer, sweep generator, noise analyzer, frequency meter, modulation meter, impedance bridge and power meter.

02.13 Analyze, adjust and troubleshoot heterodyning, frequency synthesis, phase-locked loop, signal filtering and automatic control circuits as applied to FM and PM systems.

03.0 DEMONSTRATE PROFICIENCY IN THE ANALYSIS OF TRANSMISSION LINE SYSTEMS AND ANTENNAS--The student will be able to:

03.01 Analyze and describe the concepts required to evaluate and measure the characteristics of transmission lines.

03.02 Analyze and describe the cause and effect of standing waves on transmission lines.

03.03 Calculate transmission line characteristics using a Smith chart.

03.04 Analyze and demonstrate the use of waveguide components as transmission lines.

03.05 Analyze and describe the concepts of radio wave propagation.

03.06 Analyze the theoretical concepts which define antenna equivalent circuits and couplers.

03.07 Analyze the characteristics of radiation fields.

03.08 Perform and analyze the calculations required to evaluate the effectiveness of antennas.

03.09 Set up and adjust antenna systems using a power meter and SWR meter.

04.0 DEMONSTRATE PROFICIENCY IN THE ANALYSIS OF FIBER-OPTIC SYSTEMS--The student will be able to:

04.01 Analyze and demonstrate the operation of light emitters and receivers including the LED, photoconductive cells photodiode and phototransistors.

04.02 Analyze and demonstrate the application of optical electronic devices in power control circuits and in analog, digital and data communication circuits.

04.03 Splice fiber cables.

04.04 Test and evaluate optical modulators and demodulators.

04.05 Analyze and demonstrate multiplex transmission using full and half duplex communications via a fiber-optic system.

05.0 DEMONSTRATE PROFICIENCY IN THE ANALYSIS OF DIGITAL COMMUNICATION SYSTEMS--The student will be able to:

05.01 Describe the operation of the main parts of a telephone.

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05.02 Analyze and evaluate the operation of programmable digital filters.

05.03 Describe the operation and application of compression amplifiers.

05.04 Analyze and demonstrate the operation of compander circuits.

05.05 Describe, analyze and demonstrate the operation of a sample and hold circuit.

05.06 Describe the conversion of analog signals into a digital format.

05.07 Analyze and evaluate the operation of analog to frequency and frequency to analog conversion circuits.

05.08 Describe the general characteristics of a telephone subscriber loop.

05.09 Describe, demonstrate and analyze the operation of tone dialing, DTMF (Dual Tone Multi Frequency), pulse dialing and ringing circuits.

05.10 Analyze and evaluate the operation of IC voice circuits and microphones.

05.11 Describe, evaluate and analyze the operation of a modulator/demodulator (MODEM) in the originate and answer mode.

05.12 Describe the various functions of a BORSCHT (Battery Overload Ring Supervision Coding Hybrid Test) circuit.

05.13 Describe, evaluate and analyze the operation of a subscriber line interface circuit (SLIC).

05.14 Describe and analyze the operation of pulse code modulation (PCM) circuits.

05.15 Describe, analyze and evaluate the operation of a coder/decoder (CODEC) IC circuit.

05.16 Describe, analyze and evaluate the operation of a continuously variable slope delta modulation circuit.

05.17 Describe, evaluate and analyze the operation of a time-slot assignment circuit (TSAC).

05.18 Describe and evaluate the application of fiber optic systems to telecommunications.

05.19 Analyze and describe applications of speech synthesis and recognition circuits to telecommunications.

06.0 DEMONSTRATE PROFICIENCY IN THE ANALYSIS OF DATA COMMUNICATIONS--The student will be able to:

06.01 Describe the layers of a communications system as they apply to message protocol.

06.02 Describe the protocall requirements necessary to insure the transmission of a data message.

06.03 Describe, from a system standpoint, the characteristics of the RS-232 standard.

06.04 Analyze and troubleshoot communications between a computer and a terminal and between two computers.

06.05 Compare the RS-232 standard with other communication standards (serial and parallel).

06.06 Describe, analyze, troubleshoot and demonstrate the operation of an asynchronous modem.

06.07 Utilize special purpose data system test equipment.

06.08 Identify the limitations of a telephone circuit on a data communications system.

06.09 Describe star, bus and ring topologies as applied to data networks.

06.10 Design, connect and troubleshoot a Local Area Network (LAN).

06.11 Describe the operation of a cellular communications network.

06.12 Analyze the network design criteria necessary to eliminate or reduce noise interference.

06.13 Describe and analyze error detection and correction methods used in data communication systems.

06.14 Describe basic data encryption and decryption methods.

07.0 DEMONSTRATE PROFICIENCY IN THE ANALYSIS OF SATELLITE COMMUNICATION SYSTEMS--The student will be able to:

07.01 Describe the fundamental concepts of satellite communications.

07.02 Analyze tracking antenna control systems.

07.03 Analyze low noise amplifiers.

07.04 Analyze satellite receiver systems.

07.05 Analyze and demonstrate the operation of facsimile recorders for weather patterns.

07.06 Operate amateur radio satellite communication systems.

07.07 Operate multiplexed data telemetry systems.

07.08 Plot the locations of orbiting satellites.

07.09 Operate recording systems to record data from orbiting and geostationary satellites.

08.0 DEMONSTRATE PROFICIENCY IN THE ANALYSIS OF VIDEO SYSTEMS--The student will be able to:

08.01 Describe the fundamental concepts of Television Systems.

08.02 Analyze and describe the operation of the various sections of a TV transmitter.

08.03 Analyze and describe the characteristics of the television signal.

08.04 Describe and analyze the operation of the various sections of a TV receiver.

08.05 Describe the principles of color TV.

08.06 Describe the principles of High Definition TV (HDTV).

08.07 Compare the design differences and similarities between a TV receiver and a computer monitor.

08.08 Analyze the design of a monochrome computer monitor.

08.09 Analyze the design of a color computer monitor.

08.10 Compare the design of a low resolution and a high resolution computer monitor.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title: Television Production
Occupational Area: Industrial Education

	Secondary	PSAV
Program Numbers	**8772100**	**I100104**
CIP Number	0610.010403	0610.010403
Grade Level	9-12, 30, 31	30, 31
Length	6 credits	900 hours
Certification	TEC ELEC ¶7 ¶G TV PRO TEC @7 G	TEC ELEC ¶7 ¶G TV PRO TEC @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for initial employment as television production operators, (34028252) television broadcast technicians, (34026186) camera operator, (39999203) all other professional/para-professional technicians, video recording engineers, audio recording engineers, or to provide supplemental training for persons previously or currently employed in these occupations.

The content should include, but is not be limited to, communication skills; leadership skills; human relations and employability skills; safe and efficient work practices; and preparation to assume responsibility for overall production of television studio activities including: scripts, lighting, filming and directing, electronic news gathering, and field production.

Listed below are the courses that comprise this program when offered at the secondary level:

8772110 - Television Production 1
8772120 - Television Production 2
8772130 - Television Production 3
8772140 - Television Production 4
8772150 - Television Production 5
8772160 - Television Production 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Television Production industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in camera principles, audio and video control, lighting methods, control room operation, station operation, and set preparation.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational

Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 9.0, Language 9.0, Reading 9.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 900 hours.

When the cooperative education method of instruction is used, the program length for the secondary program may be increased by a maximum of 2.0 credits.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Exhibit knowledge of the history of television and its role in the mass media.
02.0 Demonstrate knowledge of the television production technology program instructional system, safety procedures and trade terminology.
03.0 Plan a set for television production.
04.0 Perform lighting activities for a planned production.
05.0 Demonstrate correct use of basic equipment used in television production.
06.0 Demonstrate ability to identify different types of script copy.
07.0 Demonstrate ability to write script to broadcast style.
08.0 Exhibit a knowledge of the television production team.
09.0 Exhibit ability to apply skills through planning, writing, directing, editing and recording a television program.

10.0 Perform video tape recording and editing operations.
11.0 Perform television production and programming activities.
12.0 Perform character generator and special effects generator functions.
13.0 Operate television studio audio control system.
14.0 Perform electronic news gathering (ENG) and electronic field production (EFP) equipment functions.
15.0 Perform routine operator preventative maintenance operations.
16.0 Write, produce, direct and edit a variety of television programming.
17.0 Demonstrate ability in studio production regarding the selection and quality of production topics, use of appropriate equipment and adherence to production deadlines.
18.0 Understand career opportunities in the television industry.
19.0 Demonstrate an independent level of proficiency in one or more areas of television production.
20.0 Demonstrate an ability to specialize in one or more areas of television production.
21.0 Translate a written script into a full television production.
22.0 Demonstrate appropriate communication skills.
23.0 Demonstrate appropriate math skills.
24.0 Demonstrate appropriate understanding of basic science.
25.0 Demonstrate employability skills.
26.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Television Production
Secondary Number: 8772100
Postsecondary Number: I100104

01.0 EXHIBIT KNOWLEDGE OF THE HISTORY OF TELEVISION AND ITS ROLE IN THE MASS MEDIA--The student will be able to:

01.01 Describe the pre-electronic mass communication processes.
01.02 Describe the growth of communication to include the telegraph, the wireless, early radio and television.
01.03 Describe the development of networks and their impact on broadcasting.
01.04 Describe the social and political impact of television.
01.05 Discuss recent technological developments and the future of telecommunications.
01.06 Discuss recent programming developments and the future of telecommunications.

02.0 DEMONSTRATE KNOWLEDGE OF THE TELEVISION PRODUCTION TECHNOLOGY PROGRAM INSTRUCTIONAL SYSTEM, SAFETY PROCEDURES AND TRADE TERMINOLOGY--The student will be able to:

02.01 Describe the operating system of the vocational program.
02.02 State and apply general safety rules for operation of equipment and learning activities in the lab.
02.03 Utilize trade terminology in the television production lab.
02.04 Utilize trade abbreviations and acronyms as appropriate.
02.05 Transport equipment safely and securely.
02.06 Store equipment in appropriate locations.

03.0 PLAN A SET FOR TELEVISION PRODUCTION--The student will be able to:

03.01 Prepare television set for a planned production.
03.02 Draw and design a set plan to scale.
03.03 Select and arrange stage props.
03.04 Utilize hand tools to construct scene components.
03.05 Inspect and repair scenery as needed.

04.0 PERFORM LIGHTING ACTIVITIES FOR A PLANNED PRODUCTION--The student will be able to:

04.01 Describe types of lighting fixtures.
04.02 Identify parts of lighting fixtures.
04.03 Perform special effects lighting.
04.04 Set-up appropriate lighting for a production.
04.05 Describe functions of master lighting panel and dimmer board.
04.06 Operate master lighting panel to dimmer board.
04.07 Analyze lighting needs for production.

05.0 DEMONSTRATE CORRECT USE OF BASIC EQUIPMENT USED IN TELEVISION PRODUCTION--The student will be able to:

05.01 Load, record and play a video tape.
05.02 Demonstrate the steps necessary to set up, turn on and operate a video camera.
05.03 Demonstrate picture composition.
05.04 Identify, select and demonstrate use of an appropriate microphone.
05.05 Identify the qualities of a good audio track.
05.06 Demonstrate basic television lighting.
05.07 Explain the care, storage and use of television hardware and software.

06.0 DEMONSTRATE ABILITY TO IDENTIFY DIFFERENT TYPES OF SCRIPT COPY--The student will be able to:

06.01 Identify scripts by format.
06.02 Define terminology used in broadcast scriptwriting.

07.0 DEMONSTRATE ABILITY TO WRITE SCRIPT IN BROADCAST STYLE--The student will be able to:

07.01 Plan and produce a storyboard.
07.02 Specify steps leading to broadcast scripts.
07.03 Write broadcast scripts.

8.0 EXHIBIT A KNOWLEDGE OF THE TELEVISION PRODUCTION TEAM--The student will be able to:

08.01 List the job functions of the television production team.
08.02 Describe the steps of the production process.
08.03 Demonstrate ability to give and follow directions.
08.04 Demonstrate ability to function as a member of the production team.

09.0 EXHIBIT ABILITY TO APPLY SKILLS THROUGH PLANNING, WRITING, DIRECTING, EDITING AND RECORDING A TELEVISION PROGRAM--The student will be able to:

09.01 Plan a television program.
09.02 Write a television program.
09.03 Direct a television program.
09.04 Edit a television program.
09.05 Record a television program.

10.0 PERFORM VIDEO TAPE RECORDING AND EDITING OPERATIONS--The student will be able to:

10.01 Identify and describe different video tape machines.
10.02 Describe operational parts of a video tape machine.
10.03 Operate video tape machine to record and playback.
10.04 Describe operational parts of a video cassette editor.
10.05 Perform assemble edits.
10.06 Perform insert edits.

10.07 Set-up video tape machines.
10.08 Set-up video cassette editor.

11.0 PERFORM TELEVISION PRODUCTION AND PROGRAMMING ACTIVITIES--The student will be able to:

11.01 Operate master switcher.
11.02 Operate routing switcher for production and tape dubs.
11.03 Set-up machines and tuner for in-house playback.
11.04 Compute broadcast math.
11.05 Develop script for a program.
11.06 Draw story board for a planned production.
11.07 Direct participants in production of a program.
11.08 Perform on-camera.

12.0 PERFORM CHARACTER GENERATOR AND SPECIAL EFFECTS GENERATOR FUNCTIONS--The student will be able to:

12.01 Describe operational parts of character generator.
12.02 Set-up character generator.
12.03 Describe inputs of special effects generator.
12.04 Operate special effects generator during production.
12.05 Operate character generator during production.

13.0 OPERATE TELEVISION STUDIO AUDIO CONTROL SYSTEM--The student will be able to:

13.01 Identify and select microphones for production.
13.02 Place microphones for maximum effect.
13.03 Describe parts of cartridge machine.
13.04 Set-up cartridge machine for production.
13.05 Operate cartridge machine during recording and playback.
13.06 Describe parts of reel-to-reel tape machine.
13.07 Set-up reel-to-reel tape and cassette tape machines for production.
13.08 Operate reel-to-reel tape and cassette tape machines for production.
13.09 Describe parts of a turntable.
13.10 Operate turntable for production.
13.11 Describe parts of an audio mixing console.
13.12 Operate audio mixing console.

14.0 PERFORM ELECTRONIC NEWS GATHERING (ENG) AND ELECTRONIC FIELD PRODUCTION(EFP) EQUIPMENT FUNCTIONS--The student will be able to:

14.01 Describe ENG and EFP port-a-pac components.
14.02 Set up port-a-pac for field production.
14.03 Operate port-a-pac during production segments.

15.0 PERFORM ROUTINE OPERATOR PREVENTATIVE MAINTENANCE OPERATIONS--The student will be able to:

15.01 Describe types of video connectors.
15.02 Describe types of audio connectors.

15.03 Assemble audio and video cables.
15.04 Operate soldering equipment.
15.05 Clean tape heads on audio recording equipment.
15.06 Clean tape heads on video recording equipment.
15.07 Replace broken knobs.
15.08 Replace sliders and potentiometers.
15.09 Troubleshoot a bad cable connection.
15.10 Replace headshell/cartridge and balance tone arm.
15.11 Adjust turntable speed as needed.
15.12 Solder 1/4", RCA, miniature, and XLR connectors.
15.13 Strip cable for soldering.
15.14 Replace bulb in light fixture.

16.0 WRITE, PRODUCE, DIRECT AND EDIT A VARIETY OF TELEVISION PROGRAMMING--The student will be able to:

16.01 Write, produce, direct and edit a news program.
16.02 Write, produce, direct and edit an editorial.
16.03 Write, produce, direct and edit a feature program.
16.04 Write, produce, direct and edit an interview program.
16.05 Write, produce, direct and edit a commercial.

17.0 DEMONSTRATE ABILITY IN STUDIO PRODUCTION REGARDING THE SELECTION AND QUALITY OF PRODUCTION TOPICS, USE OF APPROPRIATE EQUIPMENT AND ADHERENCE TO PRODUCTION DEADLINES--The student will be able to:

17.01 Demonstrate skills in selecting production topics.
17.02 Select appropriate equipment.
17.03 Set and adhere to production deadlines.

18.0 UNDERSTAND CAREER OPPORTUNITIES IN THE TELEVISION INDUSTRY--The student will be able to:

18.01 Identify a career objective.
18.02 Identify sources of information concerning careers.
18.03 List the skills, attitudes, abilities and training required for jobs in the television industry.
18.04 List the rapid changes occurring in the television industry.
18.05 Describe employment opportunities in television related careers.
18.06 Explain the importance of updating occupational skills and knowledge through continued education and training.

19.0 DEMONSTRATE AN INDEPENDENT LEVEL OF PROFICIENCY IN ONE OR MORE AREAS OF TELEVISION PRODUCTION--The student will be able to:

19.01 Perform at an independent level of proficiency in area(s) of specialization.

20.0 DEMONSTRATE AN ABILITY TO SPECIALIZE IN ONE OR MORE AREAS OF TELEVISION PRODUCTION--The student will be able to:

20.01 Survey and select area(s) for specialization in television production.

21.0 TRANSLATE A WRITTEN SCRIPT INTO A FULL TELEVISION PRODUCTION--The student will be able to:

21.01 Produce a television program from a written script.

22.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

22.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
22.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
22.03 Read and follow written and oral instructions.
22.04 Answer and ask questions coherently and concisely.
22.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
22.06 Demonstrate appropriate telephone/communication skills.

23.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

23.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
23.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
23.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
23.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
23.05 Demonstrate an understanding of federal, state and local taxes and their computation.

24.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

24.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
24.02 Draw conclusions or make inferences from data.
24.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
24.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

25.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

25.01 Conduct a job search.
25.02 Secure information about a job.
25.03 Identify documents which may be required when applying for a job interview.
25.04 Complete a job application form correctly.
25.05 Demonstrate competence in job interview techniques.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8772150
Course Title: Television Production 5
Course Credit: 1

COURSE DESCRIPTION:

18.0 UNDERSTAND CAREER OPPORTUNITIES IN THE TELEVISION INDUSTRY--The student will be able to:

- 18.01 Identify a career objective.
- 18.02 Identify sources of information concerning careers.
- 18.03 List the skills, attitudes, abilities and training required for jobs in the television industry.
- 18.04 List the rapid changes occurring in the television industry.
- 18.05 Describe employment opportunities in television related careers.
- 18.06 Explain the importance of updating occupational skills and knowledge through continued education and training.

19.0 DEMONSTRATE AN INDEPENDENT LEVEL OF PROFICIENCY IN ONE OR MORE AREAS OF TELEVISION PRODUCTION--The student will be able to:

- 19.01 Perform at an independent level of proficiency in area(s) of specialization.

20.0 DEMONSTRATE AN ABILITY TO SPECIALIZE IN ONE OR MORE AREAS OF TELEVISION PRODUCTION--The student will be able to:

- 20.01 Survey and select area(s) for specialization in television production.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8772140
Course Title: Television Production 4
Course Credit: 1

COURSE DESCRIPTION:

15.0 PERFORM ROUTINE OPERATOR PREVENTATIVE MAINTENANCE OPERATIONS--The student will be able to:

- 15.01 Describe types of video connectors.
- 15.02 Describe types of audio connectors.
- 15.03 Assemble audio and video cables.
- 15.04 Operate soldering equipment.
- 15.05 Clean tape heads on audio recording equipment.
- 15.06 Clean tape heads on video recording equipment.
- 15.07 Replace broken knobs.
- 15.08 Replace sliders and potentiometers.
- 15.09 Troubleshoot bad cable connection.
- 15.10 Replace headshell/cartridge and balance tone arm.
- 15.11 Adjust turntable speed as needed.
- 15.12 Solder 1/4", RCA, miniature, and XLR connectors.
- 15.13 Strip cable for soldering.
- 15.14 Replace bulb in light fixture.

16.0 WRITE, PRODUCE, DIRECT AND EDIT A VARIETY OF TELEVISION PROGRAMMING--The student will be able to:

- 16.01 Write, produce, direct and edit a news program.
- 16.02 Write, produce, direct and edit an editorial.
- 16.03 Write, produce, direct and edit a feature program.
- 16.04 Write, produce, direct and edit an interview program.
- 16.05 Write, produce, direct and edit a commercial.

17.0 DEMONSTRATE ABILITY IN STUDIO PRODUCTION REGARDING THE SELECTION AND QUALITY OF PRODUCTION TOPICS, USE OF APPROPRIATE EQUIPMENT AND ADHERENCE TO PRODUCTION DEADLINES--The student will be able to:

- 17.01 Demonstrate skills in selecting production topics.
- 17.02 Select appropriate equipment.
- 17.03 Set and adhere to production deadlines.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8772130
Course Title: Television Production 3
Course Credit: 1

COURSE DESCRIPTION:

12.0 PERFORM CHARACTER GENERATOR AND SPECIAL EFFECTS GENERATOR FUNCTIONS--The student will be able to:

- 12.01 Describe operational parts of character generator.
- 12.02 Set-up character generator.
- 12.03 Describe inputs of special effects generator.
- 12.04 Operate special effects generator during production.
- 12.05 Operate character generator during production.

13.0 OPERATE TELEVISION STUDIO AUDIO CONTROL SYSTEM--The student will be able to:

- 13.01 Identify and select microphones for production.
- 13.02 Place microphones for maximum effect.
- 13.03 Describe parts of cartridge machine.
- 13.04 Set-up cartridge machine for production.
- 13.05 Operate cartridge machine during recording and playback.
- 13.06 Describe parts of reel-to-reel tape machine.
- 13.07 Set-up reel-to-reel tape and cassette tape machines for production.
- 13.08 Operate reel-to-reel tape and cassette tape machines for production.
- 13.09 Describe parts of a turntable.
- 13.10 Operate turntable for production.
- 13.11 Describe parts of an audio mixing console.
- 13.12 Operate audio mixing console.

14.0 PERFORM ELECTRONIC NEWS GATHERING (ENG) AND ELECTRONIC FIELD PRODUCTION(EFP) EQUIPMENT FUNCTIONS--The student will be able to:

- 14.01 Describe ENG and EFP port-a-pac components.
- 14.02 Set up port-a-pac for field production.
- 14.03 Operate port-a-pac during production segments.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 877214J
Course Title: Television Production 4
Course Credit: 1

COURSE DESCRIPTION:

15.0 PERFORM ROUTINE OPERATOR PREVENTATIVE MAINTENANCE OPERATIONS--The student will be able to:

- 15.01 Describe types of video connectors.
- 15.02 Describe types of audio connectors.
- 15.03 Assemble audio and video cables.
- 15.04 Operate soldering equipment.
- 15.05 Clean tape heads on audio recording equipment.
- 15.06 Clean tape heads on video recording equipment.
- 15.07 Replace broken knobs.
- 15.08 Replace sliders and potentiometers.
- 15.09 Troubleshoot bad cable connection.
- 15.10 Replace headshell/cartridge and balance tone arm.
- 15.11 Adjust turntable speed as needed.
- 15.12 Solder 1/4", RCA, miniature, and XLR connectors.
- 15.13 Strip cable for soldering.
- 15.14 Replace bulb in light fixture.

16.0 WRITE, PRODUCE, DIRECT AND EDIT A VARIETY OF TELEVISION PROGRAMMING--The student will be able to:

- 16.01 Write, produce, direct and edit a news program.
- 16.02 Write, produce, direct and edit an editorial.
- 16.03 Write, produce, direct and edit a feature program.
- 16.04 Write, produce, direct and edit an interview program.
- 16.05 Write, produce, direct and edit a commercial.

17.0 DEMONSTRATE ABILITY IN STUDIO PRODUCTION REGARDING THE SELECTION AND QUALITY OF PRODUCTION TOPICS, USE OF APPROPRIATE EQUIPMENT AND ADHERENCE TO PRODUCTION DEADLINES--The student will be able to:

- 17.01 Demonstrate skills in selecting production topics.
- 17.02 Select appropriate equipment.
- 17.03 Set and adhere to production deadlines.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8772150
Course Title: Television Production 5
Course Credit: 1

COURSE DESCRIPTION:

18.0 UNDERSTAND CAREER OPPORTUNITIES IN THE TELEVISION INDUSTRY--The student will be able to:

- 18.01 Identify a career objective.
- 18.02 Identify sources of information concerning careers.
- 18.03 List the skills, attitudes, abilities and training required for jobs in the television industry.
- 18.04 List the rapid changes occurring in the television industry.
- 18.05 Describe employment opportunities in television related careers.
- 18.06 Explain the importance of updating occupational skills and knowledge through continued education and training.

19.0 DEMONSTRATE AN INDEPENDENT LEVEL OF PROFICIENCY IN ONE OR MORE AREAS OF TELEVISION PRODUCTION--The student will be able to:

- 19.01 Perform at an independent level of proficiency in area(s) of specialization.

20.0 DEMONSTRATE AN ABILITY TO SPECIALIZE IN ONE OR MORE AREAS OF TELEVISION PRODUCTION--The student will be able to:

- 20.01 Survey and select area(s) for specialization in television production.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8772160
Course Title: Television Production 6
Course Credit: 1

COURSE DESCRIPTION:

21.0 TRANSLATE A WRITTEN SCRIPT INTO A FULL TELEVISION PRODUCTION--The student will be able to:

21.01 Produce a television program from a written script.

22.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

22.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
22.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
22.03 Read and follow written and oral instructions.
22.04 Answer and ask questions coherently and concisely.
22.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
22.06 Demonstrate appropriate telephone/communication skills.

23.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

23.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
23.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
23.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
23.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
23.05 Demonstrate an understanding of federal, state and local taxes and their computation.

24.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

24.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
24.02 Draw conclusions or make inferences from data.
24.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

24.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

25.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

25.01 Conduct a job search.
25.02 Secure information about a job.
25.03 Identify documents which may be required when applying for a job interview.
25.04 Complete a job application form correctly.
25.05 Demonstrate competence in job interview techniques.
25.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
25.07 Identify acceptable work habits.
25.08 Demonstrate knowledge of how to make job changes appropriately.
25.09 Demonstrate acceptable employee health habits.
25.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes, Chapter 442.

26.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

26.01 Define entrepreneurship.
26.02 Describe the importance of entrepreneurship to the American economy.
26.03 List the advantages and disadvantages of business ownership.
26.04 Identify the risks involved in ownership of a business.
26.05 Identify the necessary personal characteristics of a successful entrepreneur.
26.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Theater and Entertainment Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0650.999901
Grade Level	College Credits
Length	AS Degree

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as theater and entertainment technicians (962.684-014), sound controllers (194.262-014), grips (962.687-022), dressers (346.674-010), prop makers (962.281-010), lighting equipment operators (962.381-014), high riggers (962.664-010), lighting technicians (962.362-014), stage hands (962.167-014), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, training in stage craft, theatrical lighting and sound, and equipment maintenance.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Theater & Entertainment industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in stage lighting, sound, scenery construction, equipment maintenance and theatrical performance.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction is appropriate for this program. Whenever the cooperative method is offered, the following is required for each student: a training agreement, a training plan signed by the student, teacher and employer, including instructional objectives and a list of on-the-job and in-school learning experiences and a work station which reflects equipment, skills and tasks which are relevant to the occupation which the student has chosen as a career goal. The student must be paid for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The standard credit hour length for this program is 64 hours according to SBR 6A-14.030.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Construct and install theatrical scenery to the specifications required in a scene design.
02.0 Perform the duties of a stage hand.
03.0 Install and operate theatrical sound equipment for performance.
04.0 Execute a "sound score" for theatrical productions.
05.0 Hang, focus and circuit stage lights to the specifications required in lighting designs.
06.0 Perform the duties of a light board operator and follow spot operator.
07.0 Maintain theater lighting and sound equipment.
08.0 Function as part of a technical team in planning, implementing, and running the technical aspects of theatrical/entertainment procedures.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate appropriate math skills.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate employability skills.
13.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Theater and Entertainment Technology
Secondary Number:
Postsecondary Number: 0650.999901

01.0 CONSTRUCT AND INSTALL THEATRICAL SCENERY TO THE SPECIFICATIONS REQUIRED IN A SCENE DESIGN--The student will be able to:

- 01.01 Use hand and power tools commonly found in theater scene shops.
- 01.02 Draft working drawings when given a ground plan and designer's elevations.
- 01.03 Choose the appropriate materials and hardware for scenic construction.
- 01.04 Construct common flat scenery used for theatrical purposes.
- 01.05 Construct common three-dimensional scenery used for theatrical purposes.
- 01.06 Demonstrate application techniques used in painting scenery.
- 01.07 Construct special effects commonly used in the theater.

02.0 PERFORM THE DUTIES OF A STAGE HAND--The student will be able to:

- 02.01 Operate equipment commonly found in theaters.
- 02.02 Determine methods for scenery repair within a limited time frame.
- 02.03 Assume crew chief responsibilities.
- 02.04 Perform all duties in a disciplined manner as required by the demands of performance.

03.0 INSTALL AND OPERATE THEATRICAL SOUND EQUIPMENT FOR PERFORMANCE--The student will be able to:

- 03.01 Identify sound equipment used in theatrical productions.
- 03.02 Assemble various components to develop a system.
- 03.03 Install a sound system resulting in optimal performance and safety of the equipment.
- 03.04 Operate sound equipment in record and playback mode.

04.0 EXECUTE A "SOUND SCORE" FOR THEATRICAL PRODUCTIONS--The student will be able to:

- 04.01 Select sound material.
- 04.02 Prepare, by recording and editing a sound tape for theatrical productions.
- 04.03 Operate components of sound systems as required for both reinforcement and effects applications.
- 04.04 Construct and operate mechanical electrical sound effects for productions.
- 04.05 Execute sound cues in performance.

05.0 HANG, FOCUS AND CIRCUIT STAGE LIGHTS TO THE SPECIFICATIONS REQUIRED IN LIGHTING DESIGNS--The student will be able to:

05.01 Read a standard lighting plot.
05.02 Read a standard instrument schedule.
05.03 Identify stage lighting equipment.
05.04 Hang and circuit lights for a stage production.
05.05 Focus lights for a stage production.

06.0 PERFORM THE DUTIES OF A LIGHT BOARD OPERATOR AND FOLLOW SPOT OPERATOR--The student will be able to:

06.01 Make and read a lighting cue sheet.
06.02 Execute cues on a pre-set lighting board.
06.03 Program and execute cues on a memory lighting board.
06.04 Execute cues on a follow spot.

07.0 MAINTAIN THEATER LIGHTING AND SOUND EQUIPMENT--The student will be able to:

07.01 Calibrate and operate test equipment through all modes of operation as necessary for the maintenance of theater lighting and sound equipment.
07.02 Locate malfunctions in theater sound and lighting equipment using applicable diagnostic methods.
07.03 Read and understand technical manuals for theater lighting and sound equipment.
07.04 Update documentation so as to be aware of changes in manufacturer's product.
07.05 Record service records on equipment for the purpose of documenting manufacturer's warranties and maintaining a parts inventory.
07.06 Relate information about manufacturers and suppliers of theater lighting and sound equipment and supplies.

08.0 FUNCTION AS PART OF A TECHNICAL TEAM IN PLANNING, IMPLEMENTING AND RUNNING THE TECHNICAL ASPECTS OF THEATRICAL/ENTERTAINMENT PRODUCTIONS--The student will be able to:

08.01 Perform as a member of a technical team within the framework of an organized theater production.
08.02 Schedule job assignments in order to meet production deadlines.
08.03 Apply accepted principles of theater technology to a production situation(s).
08.04 Adapt learned skills and generate new approaches in order to solve unique production problems.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.

09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
11.02 Draw conclusions or make inferences from data.
11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.
12.02 Secure information about a job.
12.03 Identify documents which may be required when applying for a job interview.
12.04 Complete a job application form correctly.
12.05 Demonstrate competence in job interview techniques.
12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
12.07 Identify acceptable work habits.
12.08 Demonstrate knowledge of how to make job changes appropriately.
12.09 Demonstrate acceptable employee health habits.
12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.
13.02 Describe the importance of entrepreneurship to the American economy.
13.03 List the advantages and disadvantages of business ownership.
13.04 Identify the risks involved in ownership of a business.

13.05 Identify the necessary personal characteristics of a successful entrepreneur.

13.06 Identify the business skills needed to operate a small business efficiently and effectively.

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July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Tile Setting
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I460103**
CIP Number	0646.010300
Grade Level	30, 31
Length	500 hours
Certification	TEC CONSTR ¶7 ¶G
	BLDG CONST ¶7 ¶G
	TILE SET @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as hard tile setters (87308560), or to provide supplemental training for persons previously or currently employed in this occupation.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, proper care and use of hand tools and equipment, tile setting materials, basic blueprint reading, trade math and estimating materials for tile setting.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Tile Setting industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in adhesives, bedding materials, clay wall applications, masonry bed application, layout, setting, cutting, and grouting of ceramic tile.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 8.0, Language 8.0, Reading 8.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 500 hours.

IV. **INTENDED OUTCOMES**: After successfully completing the program, the student will be able to:

01.0 Prepare walls for drywall application of ceramic tile.
02.0 Prepare walls using wire lathe, scratch coat and screeded coat for wet wall application of ceramic tile.
03.0 Apply tile and grout utilizing drywall techniques.
04.0 Apply tile and grout utilizing wet wall techniques.
05.0 Layout, cut and install ceramic tile on walls and floors, plumb, level, and with straight joints.
06.0 Interpret blueprints and estimate materials for tile work.
07.0 Proportion and mix mortar for tile installation.
08.0 Demonstrate appropriate communication skills.
09.0 Demonstrate appropriate math skills.
10.0 Demonstrate appropriate understanding of basic science.
11.0 Demonstrate employability skills.
12.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Tile Setting
Secondary Number:
Postsecondary Number: I460103

01.0 PREPARE WALLS FOR DRYWALL APPLICATION OF CERAMIC TILE--The student will be able to:

- 01.01 Determine readiness of subsurface for tile installation.
- 01.02 Repair damaged drywall.
- 01.03 Sand and finish drywall for application of tile.

02.0 PREPARE WALLS USING WIRE LATH, SCRATCH COAT AND SCREEDED COAT FOR WET WALL APPLICATION OF CERAMIC TILE--The student will be able to:

- 02.01 Install screed mud over concrete slab to install shower floor.
- 02.02 Measure and cut metal lath to size for walls and ceilings with tin snips.
- 02.03 Tack lath to wall and ceiling surfaces with staple gun or hammer.
- 02.04 Spread plaster base over lath with trowel and level plaster to specified thickness, using screed.
- 02.05 Spread concrete on subfloor with trowel and level it with screed.
- 02.06 Remove and replace existing backing materials in wet area.

03.0 APPLY TILE AND GROUT UTILIZING DRYWALL TECHNIQUES--The student will be able to:

- 03.01 Set tile on drywall with thinset.
- 03.02 Set tile using mastic adhesives.
- 03.03 Position tile and tap it with trowel handle to affix tile to plaster or adhesive.
- 03.04 Install tile over wire mesh and concrete masonry units.
- 03.05 Install tile over wood counter top.
- 03.06 Install counter top backsplash designs.
- 03.07 Layout counter top and backsplash designs.
- 03.08 Grout counter top and backsplash.
- 03.09 Grout floor tile.

04.0 APPLY TILE AND GROUT UTILIZING WET WALL TECHNIQUES--The student will be able to:

- 04.01 Grout tile on walls and floors.
- 04.02 Install tile floor over concrete slab using thinset.
- 04.03 Replace grout.
- 04.04 Grout wet area installation.
- 04.05 Install tile in shower stall.
- 04.06 Lay out shower.
- 04.07 Build a shower curb.
- 04.08 Prepare shower floor for tile installation.

04.09 Install wire mesh mortar units in a shower.
04.10 Install wire mesh mortar units in a tub surround.

05.0 LAYOUT, CUT AND INSTALL CERAMIC TILE ON WALLS AND FLOORS, PLUMB, LEVEL, AND WITH STRAIGHT JOINTS--The student will be able to:

05.01 Select and use tile setting tools.
05.02 Use tile nippers to nip different types of tile.
05.03 Cut and shape tile with tile cutters and biters.
05.04 Cut different types of tile with tile hand cutters.
05.05 Cut tile with rod saw.
05.06 Use a level.
05.07 Use electric drill.
05.08 Use tile saw.
05.09 Use tile cutter.
05.10 Cut tile with electric saw.
05.11 Clean tools and maintain in working order.
05.12 Smooth cut tile edges with grinding stone.
05.13 Select and use measurement tools.
05.14 Install tile plumb and level using level.
05.15 Square tile layouts using a steel square
05.16 Maintain true and correct tile work with square.
05.17 Maintain clean, neat, and safe work area.
05.18 Practice personal and general job safety procedures of tile setters.
05.19 Miter base tile to fit angles.
05.20 Miter cap tile to fit angles.
05.21 Draw level starting and field lines, and level curbs and door jambs using a level.
05.22 Lay down working, finish, plumb, and level lines using a chalk line.
05.23 Butt tile rows using straightedge on starting line.
05.24 Figure layout.
05.25 Measure, cut, and install metal lath for shower pan.
05.26 Chisel tile and setting related substances.
05.27 Lay out tile setting jobs.
05.28 Lay out floor.
05.29 Install tile over previously poured interior concrete floor.
05.30 Install tile over wood floor.
05.31 Install ceramic tile over existing floor covering.
05.32 Install tile over existing tile.
05.33 Install tile floor over wood floor using mastic adhesive.
05.34 Install floor tile over wire mesh mortar units.
05.35 Install tile on exterior floor.
05.36 Install ceramic tile over laminated counter top and backsplash.
05.37 Install ceramic tile over ceramic tile on tub surround
05.38 Install marble window sills.
05.39 Install tile window sills.
05.40 Install a complete shower floor.
05.41 Clean aged tile.
05.42 Replace loose or damaged tile.
05.43 Measure and cut marble window sills.
05.44 Remove and replace shower floor and base.
05.45 Install fixtures.

06.0 INTERPRET BLUEPRINTS AND ESTIMATE MATERIALS FOR TILE WORK--The student will be able to:

06.01 Apply basic math skills to tile setting.
06.02 Measure floors, and walls using steel measuring tapes.
06.03 Measure tile cuts using wood folding rule.
06.04 Figure total tile amounts needed for job.
06.05 Estimate how many square feet of tile needed for bathroom walls.
06.06 Estimate how many square feet of tile needed for floor areas.
06.07 Calculate costs.
06.08 Maintain records of materials used.
06.09 Read blueprints and specification sheets that apply to tile setting.
06.10 Examine blueprints, measure and mark surfaces to be covered and lay out work.
06.11 Prepare list of supplies and tools needed to complete a job.

07.0 PROPORTION AND MIX MORTAR FOR TILE INSTALLATION--The student will be able to:

07.01 Mix setting materials manually with hand tools and equipment.
07.02 Mix setting materials with a power mixer.
07.03 Follow safety practices when mixing setting materials.
07.04 Follow manufacturers directions.
07.05 Select and mix adhesives to set tile.
07.06 Determine quantity and type of setting materials needed.
07.07 Proportion setting materials ingredients for specific uses.

08.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

08.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
08.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
08.03 Read and follow written and oral instructions.
08.04 Answer and ask questions coherently and concisely.
08.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
08.06 Demonstrate appropriate telephone/communication skills.

09.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

09.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
09.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
09.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
09.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

09.05 Demonstrate an understanding of federal, state and local taxes and their computation.

10.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

10.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
10.02 Draw conclusions or make inferences from data.
10.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
10.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

11.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

11.01 Conduct a job search.
11.02 Secure information about a job.
11.03 Identify documents which may be required when applying for a job interview.
11.04 Complete a job application form correctly.
11.05 Demonstrate competence in job interview techniques.
11.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
11.07 Identify acceptable work habits.
11.08 Demonstrate knowledge of how to make job changes appropriately.
11.09 Demonstrate acceptable employee health habits.
11.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

12.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

12.01 Define entrepreneurship.
12.02 Describe the importance of entrepreneurship to the American economy.
12.03 List the advantages and disadvantages of business ownership.
12.04 Identify the risks involved in ownership of a business.
12.05 Identify the necessary personal characteristics of a successful entrepreneur.
12.06 Identify the business skills needed to operate a small business efficiently and effectively.

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Tractor and Trailer Body Repair and Refinishing
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I470613**
CIP Number	0647.060301
Grade Level	30, 31
Length	1800 hours
Certification	AUTO BODY @7 G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as truck body builders (807.281-010), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, and the repair of bodies, fenders, and chassis of tractors and trailers.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Body Repair and Refinishing industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in welding, sheetmetal work, plastic and fiberglass repair, painting, detailing, and frame straightening and repair on tractors and trailers.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is:

Mathematics 7.0, Language 7.0, Reading 8.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1800 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Demonstrate understanding of shop procedures.
02.0 Demonstrate use, care and maintenance of hand tools and power tools.
03.0 Align frames and suspension components.
04.0 Perform sheetmetal, wood, and aluminum frame, body, and chassis repairs on trailers.
05.0 Replace and repair fiberglass and plastic body components.
06.0 Replace window glass.
07.0 Rebuild and prime body panels.
08.0 Apply finish coats to prepared panels.
09.0 Demonstrate welding skills.
10.0 Perform detail work.
11.0 Demonstrate appropriate communication skills.
12.0 Demonstrate appropriate math skills.
13.0 Demonstrate appropriate understanding of basic science.
14.0 Demonstrate employability skills.
15.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Tractor And Trailer Body Repair And Refinishing
Secondary Number:
Postsecondary Number: I470613

01.0 DEMONSTRATE UNDERSTANDING OF SHOP PROCEDURES--The student will be able to:

- 01.01 Apply school and shop policies and procedures.
- 01.02 Apply shop safety rules and procedures.
- 01.03 Apply personal safety rules and procedures.
- 01.04 Apply electrical safety rules and procedures.
- 01.05 Apply fire safety rules and procedures.

02.0 DEMONSTRATE USE, CARE, AND MAINTENANCE OF HAND TOOLS AND POWER TOOLS--The student will be able to:

- 02.01 Identify, use, and show proper care and maintenance for the various hand tools employed by a body repair and refinishing technician.
- 02.02 Identify, use, and show proper care and maintenance for the various power tools employed by a body repair and refinishing technician.
- 02.03 Identify, use, and show proper care and maintenance for the various shop equipment employed by a body repair and refinishing technician.

03.0 ALIGN FRAMES AND SUSPENSION COMPONENTS--The student will be able to:

- 03.01 Diagnose and measure frame damage using self-centering, tram, and datum line gauges.
- 03.02 Straighten and align mash, sag, sideways, twist, kickup, broadside, and diamond frame damage.
- 03.03 Remove and replace damaged frame horns, side rails, cross members, front or rear frame sections; weld cracks in frame members.
- 03.04 Clean, prime, and protective-coat repaired frame areas.
- 03.05 Repair, reinforce, or replace weakened frame members in accordance with manufacturers' recommendations.

04.0 PERFORM SHEETMETAL,WOOD, AND ALUMINUM FRAME, BODY, AND CHASSIS REPAIRS ON TRAILERS--The student will be able to:

- 04.01 Remove and replace a bolted panel on panel assembly.
- 04.02 Remove and replace a welded sheetmetal panel or panel assembly.
- 04.03 Remove folds, curves, creases, and dents using power tools and hand tools to restore damaged areas to proper contours and dimensions.
- 04.04 Weld cracked or torn sheet steel body panels. Re-weld broken welds.

04.05 Weld cracked or torn aluminum body panels. Re-weld broken welds.

04.06 Cut out damaged sections of sheet steel body panels and weld in replacements.

04.07 Cut out damaged sections of aluminum body panels and weld in replacements.

04.08 Heat shrink stretched panel areas back to contour.

04.09 Cold shrink stretched panel areas back to contour.

04.10 Recheck panel contour and alignment after shaping and correct or adjust as necessary.

04.11 Braze body panels only in locations recommended by manufacturer.

04.12 Straighten roughed-out contours of damaged panel to a surface condition for bodyfilling or metal finishing.

05.0 REPLACE AND REPAIR FIBERGLASS AND PLASTIC BODY COMPONENTS--The student will be able to:

05.01 Repair deep gauges and cracks in fiberglass panels.

05.02 Repair holes in fiberglass panels.

05.03 Replace fiberglass body panels and straighten or align panel supports.

05.04 Remove damaged areas from fiberglass panels. Repair with partial panel installation.

05.05 Identify the type of plastic to be repaired and the appropriate repair procedure (including hot air welding, chemical bonding, and the use of structural adhesives).

05.06 Prepare the surface of thermoplastic parts and repair damage.

05.07 Prepare the surface of thermosetting plastic parts and repair damage.

06.0 REPLACE WINDOW GLASS--The student will be able to:

06.01 Inspect, adjust, repair, or replace window regulators, run channels, glass, power mechanisms, and related controls.

06.02 Diagnose and repair water leaks, dust leaks, and wind noises.

06.03 Inspect, repair, and replace weather stripping.

06.04 Inspect, remove, and replace all stationary glass (including windshields, backlights, etc.), using manufacturers' recommended installation materials and procedures.

07.0 REBUILD AND PRIME BODY PANELS--The student will be able to:

07.01 Determine the extent of the direct and indirect damage, the direction of impact, and plan the methods and order of repair.

07.02 Straighten and align cowl assembly.

07.03 Straighten and align roof pillars and roof panels.

07.04 Straighten and align door posts.

07.05 Straighten and align door sills, floor pan, and rocker panels.

07.06 Straighten and align quarter panels, wheel house assemblies, and rear body sections.

07.07 Remove and replace hood, hood hinges, and hood latch.

07.08 Remove and replace doors and hinges.

07.09 Remove and replace bumpers, reinforcements, guards, isolators, and mounting hardware.
07.10 Check and adjust hood clearances to adjoining panels.
07.11 Check door hinge condition; check door frames for square;check and adjust door clearances (where adjustable) along quarter panel, door, rocker panel, fender, and top.
07.12 Check and adjust bumper clearances to adjacent body and filler.
07.13 Repair or replace door skins and intrusion beams.
07.14 Restore protective coatings and sealants.
07.15 Grind the paint from the damaged area of a body panel to eliminate surface irregularities.
07.16 Pick and file the damaged area of a body panel to eliminate surface irregularities
07.17 Disc sand the repaired body panel to produce final smoothness.
07.18 Mix plastic filler.
07.19 Apply plastic body filler and cheese grate during curing.
07.20 Round sand cured plastic body panel for solder filling.
07.21 Clean and file surface of body panel for solder filling.
07.22 Apply and paddle body solder.
07.23 Grind and file body solder to contour and finish sand.
07.24 Neutralize the thinning agent acid.

08.0 APPLY FINISH COATS TO PREPARED PANELS--The student will be able to:

08.01 Use primers and sealers.
08.02 Clean surface for refinishing.
08.03 Sand painted surfaces.
08.04 Perform masking techniques.
08.05 Mix and tint paint.
08.06 Strip damaged finish.
08.07 Detail and touch up finished job.
08.08 Apply acrylic lacquer top coat.
08.09 Apply acrylic enamel top coat.
08.10 Apply polyurethane top coat.
08.11 Apply alkyd enamel top coat.
08.12 Apply stripes and decals.
08.13 Perform spot paint repair.

09.0 DEMONSTRATE WELDING SKILLS--The student will be able to:

09.01 Set up and operate oxyacetylene equipment.
09.02 Construct a butt and lap joint weld.
09.03 Braze a lap joint weld (horizontal position).
09.04 Set up and operate shielded metal arc welding equipment.
09.05 Set up and operate gas metal arc welding station.
09.06 Weld straight bead pattern.

10.0 PERFORM DETAIL WORK--The student will be able to:

10.01 Perform cleaning and restoring of interior areas.
10.02 Perform cleaning and restoring of exterior areas.
10.03 Perform cleaning and restoring of engine compartment.

11.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 11.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 11.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 11.03 Read and follow written and oral instructions.
- 11.04 Answer and ask questions coherently and concisely.
- 11.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 11.06 Demonstrate appropriate telephone/communication skills.

12.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 12.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 12.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 12.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 12.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 12.05 Demonstrate an understanding of federal, state and local taxes and their computation.

13.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 13.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 13.02 Draw conclusions or make inferences from data.
- 13.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 13.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

14.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 14.01 Conduct a job search.
- 14.02 Secure information about a job.
- 14.03 Identify documents which may be required when applying for a job interview.
- 14.04 Complete a job application form correctly.
- 14.05 Demonstrate competence in job interview techniques.
- 14.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
- 14.07 Identify acceptable work habits.
- 14.08 Demonstrate knowledge of how to make appropriate job changes.
- 14.09 Demonstrate acceptable employee health habits.
- 14.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

15.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

15.01 Define entrepreneurship.
15.02 Describe the importance of entrepreneurship to the American economy.
15.03 List the advantages and disadvantages of business ownership.
15.04 Identify the risks involved in ownership of a business.
15.05 Identify the necessary personal characteristics of a successful entrepreneur.
15.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Upholstery and Furniture Refinishing
Occupational Area:	Industrial Education
	Secondary
Program Numbers	**8775000**
CIP Number	0648.030302
Grade Level	9-12, 30, 31
Length	6 credits
Certification	FURN REPR @7 G
	HOMEMAKING !2 !7G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as upholsterers (89508733), or upholstery helpers, (780.687-054).

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, preparation of furniture for reupholstering, making patterns and coverings and trimming upholstered items.

Listed below are the courses that comprise this program when offered at the secondary level:

8775010 - Upholstery and Furniture Refinishing 1
8775020 - Upholstery and Furniture Refinishing 2
8775030 - Upholstery and Furniture Refinishing 3
8775040 - Upholstery and Furniture Refinishing 4
8775050 - Upholstery and Furniture Refinishing 5
8775060 - Upholstery and Furniture Refinishing 6

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Upholstery industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in the use of power machines and hand tools in cutting, sewing, and reupholstering activities.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

The outcomes and student performance standards which the handicapped student must master must be specified in each student's Individual Education Plan (IEP). Additional credits may be earned when outcomes and standards are mastered in accordance with subsequent IEPs. The job title for which the student is being trained must be designated in the IEP.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Use trade skills.
02.0 Maintain and operate power machines.
03.0 Use upholstery skills.
04.0 Perform management skills.
05.0 Make and use patterns.
06.0 Prepare furniture for reupholstering.
07.0 Reupholster simple upholstered items.
08.0 Demonstrate appropriate communication skills.
09.0 Demonstrate appropriate math skills.
10.0 Demonstrate appropriate understanding of basic science.
11.0 Demonstrate employability skills.
12.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Upholstery And Furniture Refinishing
Secondary Number: 8775000
Postsecondary Number:

01.0 USE TRADE SKILLS--The student will be able to:

- 01.01 Identify furniture styles.
- 01.02 se upholstery terminology.
- 01.03 Use upholstery tools.
- 01.04 Maintain the shop.
- 01.05 Understand and demonstrate proper safety precautions when using upholstery tools and machinery.

02.0 MAINTAIN AND OPERATE POWER MACHINES--The student will be able to:

- 02.01 Operate and maintain domestic sewing machines.
- 02.02 Operate and maintain straight needle machines.
- 02.03 Operate and maintain walking foot machines.
- 02.04 Operate and maintain foam grinder.
- 02.05 Operate and maintain cushion stuffers.
- 02.06 Operate and maintain steam machines.

03.0 USE UPHOLSTERY SKILLS--The student will be able to:

- 03.01 Reconstruct deck with coil springs.
- 03.02 Reconstruct deck with zig-zag springs.
- 03.03 Reconstruct deck with rubber webbing.
- 03.04 Construct standard back.
- 03.05 Construct a loose pillow back.

04.0 PERFORM MANAGEMENT SKILLS--The student will be able to:

- 04.01 Estimate cost and completion time.
- 04.02 Complete a work order.
- 04.03 Perform shop foreman duties.
- 04.04 Take inventory.

05.0 MAKE AND USE PATTERNS--The student will be able to:

- 05.01 Estimate fabric needed for final cover.
- 05.02 Mark pattern on fabric.
- 05.03 Cut out marked fabric.

06.0 PREPARE FURNITURE FOR REUPHOLSTERING--The student will be able to:

- 06.01 Strip furniture to frame.
- 06.02 Repair frame.
- 06.03 Construct decorative items.
- 06.04 Repair/refinish exposed wood surfaces.

07.0 REUPHOLSTER SIMPLE UPHOLSTERED ITEMS--The student will be able to:

07.01 Cover inside arms and/or wings.
07.02 Cover outside arms and/or wings.
07.03 Cover outside backs.
07.04 Construct a ruffled skirt.
07.05 Construct a pleated skirt.
07.06 Construct a lined-tailored skirt.
07.07 Attach cambric.
07.08 Construct a box cushion cover.
07.09 Construct a "T" cushion cover.
07.10 Construct a knife edge cushion cover.
07.11 Construct a pleated cushion cover.

08.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

08.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
08.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
08.03 Read and follow written and oral instructions.
08.04 Answer and ask questions coherently and concisely.
08.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
08.06 Demonstrate appropriate telephone/communication skills.

09.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

09.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
09.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
09.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
09.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
09.05 Demonstrate an understanding of federal, state and local taxes and their computation.

10.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

10.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
10.02 Draw conclusions or make inferences from data.
10.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
10.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

11.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

11.01 Conduct a job search.
11.02 Secure information about a job.
11.03 Identify documents which may be required when applying for a job interview.
11.04 Complete a job application form correctly.
11.05 Demonstrate competence in job interview techniques.
11.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
11.07 Identify acceptable work habits.
11.08 Demonstrate knowledge of how to make job changes appropriately.
11.09 Demonstrate acceptable employee health habits.
11.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

12.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

12.01 Define entrepreneurship.
12.02 Describe the importance of entrepreneurship to the American economy.
12.03 List the advantages and disadvantages of business ownership.
12.04 Identify the risks involved in ownership of a business.
12.05 Identify the necessary personal characteristics of a successful entrepreneur.
12.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8775010
Course Title: Upholstery and Furniture Refinishing 1
Course Credit: 1

COURSE DESCRIPTION:

This course will provide instruction and shop/lab experience in trade and employability skills.

01.0 USE TRADE SKILLS--The student will be able to:

- 01.01 Identify furniture styles.
- 01.02 Use upholstery terminology.
- 01.03 Use upholstery tools.
- 01.04 Maintain the shop.
- 01.05 Understand and demonstrate proper safety precautions when using upholstery tools and machinery.

08.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

- 08.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
- 08.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
- 08.03 Read and follow written and oral instructions.
- 08.04 Answer and ask questions coherently and concisely.
- 08.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
- 08.06 Demonstrate appropriate telephone/communication skills.

11.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

- 11.01 Conduct a job search.
- 11.02 Secure information about a job.
- 11.03 Identify documents which may be required when applying for a job interview.
- 11.04 Complete a job application form correctly.
- 11.05 Demonstrate competence in job interview techniques.
- 11.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
- 11.07 Identify acceptable work habits.
- 11.08 Demonstrate knowledge of how to make job changes appropriately.
- 11.09 Demonstrate acceptable employee health habits.
- 11.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

12.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

12.01 Define entrepreneurship.
12.02 Describe the importance of entrepreneurship to the American economy.
12.03 List the advantages and disadvantages of business ownership.
12.04 Identify the risks involved in ownership of a business.
12.05 Identify the necessary personal characteristics of a successful entrepreneur.
12.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8775020
Course Title: Upholstery and Furniture Refinishing 2
Course Credit: 1

COURSE DESCRIPTION:

This course will provide instruction and shop/lab experience in operating and maintaining power machines.

02.0 MAINTAIN AND OPERATE POWER MACHINES--The student will be able to:

- 02.01 Operate and maintain domestic sewing machines.
- 02.02 Operate and maintain straight needle machines.
- 02.03 Operate and maintain walking foot machines.
- 02.04 Operate and maintain foam grinder.
- 02.05 Operate and maintain cushion stuffers.
- 02.06 Operate and maintain steam machines.

10.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

- 10.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
- 10.02 Draw conclusions or make inferences from data.
- 10.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
- 10.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

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July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8775030
Course Title: Upholstery and Furniture Refinishing 3
Course Credit: 1

COURSE DESCRIPTION:

This course will provide instruction and shop/lab experience in upholstery skills.

03.0 USE UPHOLSTERY SKILLS--The student will be able to:

- 03.01 Reconstruct deck with coil springs.
- 03.02 Reconstruct deck with zig-zag springs.
- 03.03 Reconstruct deck with rubber webbing.
- 03.04 Construct standard back.
- 03.05 Construct a loose pillow back.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8775040
Course Title: Upholstery and Furniture Refinishing 4
Course Credit: 1

COURSE DESCRIPTION:

This course will provide instruction and shop/lab experience in management and pattern skills.

04.0 PERFORM MANAGEMENT SKILLS--The student will be able to:

- 04.01 Estimate cost and completion time.
- 04.02 Complete a work order.
- 04.03 Perform shop foreman duties.
- 04.04 Take inventory.

05.0 MAKE AND USE PATTERNS--The student will be able to:

- 05.01 Estimate fabric needed for final cover.
- 05.02 Mark pattern on fabric.
- 05.03 Cut out marked fabric.

09.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

- 09.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
- 09.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
- 09.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
- 09.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
- 09.05 Demonstrate an understanding of federal, state and local taxes and their computation.

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July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8775050
Course Title: Upholstery and Furniture Refinishing 5
Course Credit: 1

COURSE DESCRIPTION:

This course will provide instruction and shop/lab experience in constructing furniture foundations.

06.0 PREPARE FURNITURE FOR REUPHOLSTERING--The student will be able to:

- 06.01 Strip furniture to frame.
- 06.02 Repair frame.
- 06.03 Construct decorative items.
- 06.04 Repair/refinish exposed wood surfaces.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Course Number: 8775060
Course Title: Upholstery and Furniture Refinishing 6
Course Credit: 1

COURSE DESCRIPTION:

This course will provide instruction and shop/lab experience in constructing cushion and wood furniture touch-up and repair.

07.0 REUPHOLSTER SIMPLE UPHOLSTERED ITEMS--The student will be able to:

07.01 Cover inside arms and/or wings.
07.02 Cover outside arms and/or wings.
07.03 Cover outside backs.
07.04 Construct a ruffled skirt.
07.05 Construct a pleated skirt.
07.06 Construct a lined-tailored skirt.
07.07 Attach cambric.
07.08 Construct a box cushion cover.
07.09 Construct a "T" cushion cover.
07.10 Construct a knife edge cushion cover.
07.11 Construct a pleated cushion cover.

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July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Upholstery and Furniture Refinishing Technology
Occupational Area:	Industrial Education
	PSAV
Program Numbers	**I480303**
CIP Number	0648.030300
Grade Level	30, 31
Length	1800 hours
Certification	FURN REPR @7 G
	HOMEMAKING !2 !7G

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as furniture upholsterers, upholstery shop helpers (89508733), (780.687-054), upholstery installers (915.687-010), sewing machine operators (780.682-010), fabric layout and cutters (781.384-010), cushion construction or upholsterers (780.684-042), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills; leadership skills; human relations and employability skills; safe and efficient work practices; installation, repair, arrangement, and securing springs, filler, padding, and covering material and cutting, sewing and trimming upholstered items.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Upholstery industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in the use of power sewing machines, cushion stuffers, foam cutters, foam grinders, spray guns, band saws, belt sanders, drills and drill presses, portable power hand tools, air staple guns and hand tools.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional

objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 7.0, Language 7.0, Reading 7.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1800 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Use trade skills.
02.0 Maintain and operate power machines.
03.0 Use upholstery skills.
04.0 Perform management skills.
05.0 Make and use patterns.
06.0 Build foundations.
07.0 Construct cushions.
08.0 Touch-up wood finish.
09.0 Demonstrate appropriate communication skills.
10.0 Demonstrate appropriate math skills.
11.0 Demonstrate appropriate understanding of basic science.
12.0 Demonstrate employability skills.
13.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Upholstery And Furniture Refinishing Technology

Secondary Number:
Postsecondary Number: I480303

01.0 USE TRADE SKILLS--The student will be able to:

- 01.01 Identify furniture styles.
- 01.02 Use upholstery terminology.
- 01.03 Use upholstery tools.
- 01.04 Maintain the shop.
- 01.05 Clean shop.
- 01.06 Use appropriate fabric and thread.
- 01.07 Estimate fabric needed for final cover.
- 01.08 Mark pattern on fabric.
- 01.09 Cut out marked fabric

02.0 MAINTAIN AND OPERATE POWER MACHINES--The student will be able to:

- 02.01 Operate and maintain domestic sewing machines.
- 02.02 Operate and maintain straight needle machines.
- 02.03 Operate and maintain walking foot machines.
- 02.04 Operate and maintain foam grinder.
- 02.05 Operate and maintain cushion stuffers.
- 02.06 Operate and maintain steam machines.

03.0 USE UPHOLSTERY SKILLS--The student will be able to:

- 03.01 Strip furniture down to frame.
- 03.02 Repair frame.
- 03.03 Construct decorative items.
- 03.04 Reconstruct deck with coil springs.
- 03.05 Reconstruct deck with zig-zag springs.
- 03.06 Reconstruct deck with rubber webbing.
- 03.07 Cover inside arms and/or wings.
- 03.08 Construct standard back.
- 03.09 Construct a loose pillow back.
- 03.10 Construct a barrel back.
- 03.11 Construct a mock diamond-tufted back.
- 03.12 Construct a diamond-tufted back.
- 03.13 Construct an attached pillow/bag back
- 03.14 Construct a channel back.
- 03.15 Cover outside arms and/or wings.
- 03.16 Cover outside back.
- 03.17 Construct a ruffled skirt.
- 03.18 Construct a pleated skirt.
- 03.19 Construct a lined-tailored skirt.
- 03.20 Attach cambric.

04.0 PERFORM MANAGEMENT SKILLS--The student will be able to:

04.01 Estimate cost and completion time.
04.02 Complete a work order.
04.03 Perform shop foreman duties.
04.04 Take inventory.

05.0 MAKE AND USE PATTERNS--The student will be able to:

05.01 Estimate fabric needed for final cover.
05.02 Mark pattern on fabric.
05.03 Cut out marked fabric.

06.0 BUILD FOUNDATIONS--The student will be able to:

06.01 Strip furniture to frame.
06.02 Repair frame.
06.03 Construct decorative items.
06.04 Repair/refinish exposed wood surfaces.
06.05 Respring a sofa.
06.06 Respring a chair.

07.0 CONSTRUCT CUSHIONS--The student will be able to:

07.01 Construct a box cushion cover.
07.02 Construct a "T" cushion cover.
07.03 Construct a knife edge cushion cover.
07.04 Construct a pleated cushion cover.
07.05 Construct a cushion cover with inside springs.
07.06 Construct an attached cushion seat cover.

08.0 TOUCH UP WOOD FINISH--The student will be able to:

08.01 Repair scratches in wood finish.
08.02 Repair holes in wood finish.

09.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

09.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
09.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
09.03 Read and follow written and oral instructions.
09.04 Answer and ask questions coherently and concisely.
09.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
09.06 Demonstrate appropriate telephone/communication skills.

10.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

10.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.

10.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.

10.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.

10.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.

10.05 Demonstrate an understanding of federal, state and local taxes and their computation.

11.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

11.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.

11.02 Draw conclusions or make inferences from data.

11.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.

11.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

12.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

12.01 Conduct a job search.

12.02 Secure information about a job.

12.03 Identify documents which may be required when applying for a job interview.

12.04 Complete a job application form correctly.

12.05 Demonstrate competence in job interview techniques.

12.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.

12.07 Identify acceptable work habits.

12.08 Demonstrate knowledge of how to make job changes appropriately.

12.09 Demonstrate acceptable employee health habits.

12.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

13.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

13.01 Define entrepreneurship.

13.02 Describe the importance of entrepreneurship to the American economy.

13.03 List the advantages and disadvantages of business ownership.

13.04 Identify the risks involved in ownership of a business.

13.05 Identify the necessary personal characteristics of a successful entrepreneur.

13.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Vending And Recreational Machine Repair
Program Type:	Job Preparatory
Occupational Area:	Industrial Education
Components:	N/A
	PSAV
Program Numbers	**I470109**
CIP Number	0647.010900
Grade Level	30, 31
Length	1200 Hours
Certification	ELECTRONIC @7 G
	APPLI REPR @7 G
Facility Code	245
VSO	VICA
Coop Method	Yes
Apprenticeship	No

I. **PURPOSE:** The purpose of this program is to prepare students for employment as coin and vending machine servicer (85947656), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, machine assembly, installation service and repair of vending and recreational machines.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Machine repair industry; planning, management, finance, technical and production skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in troubleshooting defective equipment, basic plumbing, refrigeration, electrical/electronics, machine refinishing, moving and set-up, sanitation, and recordkeeping.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the

following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a career goal. The student must receive compensation for work performed.

In accordance with Rule 6A-10.040, FAC, the minimum basic skills grade level required for this postsecondary adult vocational program is: Mathematics 7.0, Language 7.0, Reading 7.0. This grade level number corresponds to a grade equivalent score obtained on a state designated basic skills examination.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

This program may be offered in courses. Vocational credit shall be awarded to the student on a transcript in accordance with Section 230.643, F.S.

The typical length of this program for the average achieving student is 1200 hours.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

OCCUPATIONAL COMPLETION POINT - DATA CODE A

COIN AND VENDING MACHINE SERVICER - OES Code 85947656

01.0 Select and use tools and equipment.
02.0 Read and interpret blueprints and schematics.
03.0 Perform basic soldering.
04.0 Move and set up vending machines.
05.0 Load and operate machines.
06.0 Troubleshoot and repair coin mechanisms.
07.0 Perform minor maintenance and repair of machines.
08.0 Demonstrate appropriate sanitation practices.
09.0 Perform basic electrical/electronic repairs.
10.0 Perform piping and plumbing repairs.
11.0 Perform refrigeration system repairs.
12.0 Perform major machine maintenance.
13.0 Repair and refinish metal.
14.0 Maintain records and meet sanitation standards.
15.0 Demonstrate appropriate communication skills.
16.0 Demonstrate appropriate math skills.
17.0 Demonstrate appropriate understanding of basic science.
18.0 Demonstrate employability skills.
19.0 Demonstrate an understanding of entrepreneurship.

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Vending And Recreational Machine Repair
Secondary Number:
Postsecondary Number: I470109

OCCUPATIONAL COMPLETION POINT - DATA CODE A
COIN AND VENDING MACHINE SERVICER - OES Code 85947656

01.0 SELECT AND USE TOOLS AND EQUIPMENT--The student will be able to:

- 01.01 Identify hand tools.
- 01.02 Utilize measuring tools.
- 01.03 Select and use basic shop equipment.
- 01.04 Operate and maintain welding equipment.
- 01.05 Operate water testing equipment.

02.0 READ AND INTERPRET BLUE PRINTS AND SCHEMATICS--The student will be able to:

- 02.01 Interpret detail drawings.
- 02.02 Read symbols.
- 02.03 List materials for fabrication.
- 02.04 Develop shop drawings.
- 02.05 Trace out color coded circuits.
- 02.06 Prepare pictorial drawings for circuits.
- 02.07 Prepare exploded views circuits.
- 02.08 Take dimensions off drawings.

03.0 PERFORM BASIC SOLDERING--The student will be able to:

- 03.01 Employ safe shop practices.
- 03.02 Identify joints, positions and metal thickness.
- 03.03 Weld plates in flat position.
- 03.04 Weld square edge bolt, 3/16" plate, filed 3/16", in vertical position.
- 03.05 Lab weld 3/16" plate in vertical position.
- 03.06 Fillet weld ¼" plate in vertical position.
- 03.07 Lap weld ¼" plate in vertical position.
- 03.08 Butt weld 3/16" plate in horizontal position.
- 03.09 Butt weld ¼" plate in horizontal position.
- 03.10 Butt weld 3/16" plate (top level plate) in horizontal position.
- 03.11 Butt weld 3/16" plate in overhead position.
- 03.12 Lap weld 3/16" plate in overhead position.
- 03.13 Butt weld ¼" plate in overhead position.

04.0 MOVE AND SET UP VENDING MACHINES--The student will be able to:

- 04.01 Apply state vehicle code as applied to automatic vending machines.
- 04.02 Practice defensive driving.

04.03 Demonstrate knowledge of private property regulations.
04.04 Demonstrate knowledge of company regulations.
04.05 Maintain vehicle of transport.
04.06 Load vehicle to insure product care and product separation.
04.07 Maintain vehicle and product cleanliness.

05.0 LOAD AND OPERATE MACHINES--The student will be able to:

05.01 Load dispensing machines.
05.02 Test operation of machine following loading.

06.0 TROUBLESHOOT AND REPAIR COIN MECHANISMS--The student will be able to:

06.01 Disconnect and reassemble national rejector.
06.02 Disconnect and reassemble coin acceptor.
06.03 Disassemble and reassemble coin changers.
06.04 Trouble shoot wiring assembly.
06.05 Test changer for operation.
06.06 Apply and maintain steppers and accumulators.

07.0 PERFORM MINOR MAINTENANCE AND REPAIR OF MACHINES--The student will be able to:

07.01 Identify food vending machines by type through age dating.
07.02 Conduct preventative maintenance in food vending machines.
07.03 Identify cup dispensing variances in beverage machines.
07.04 Trouble shoot refrigeration devices in beverage dispensing machines.
07.05 Evaluate liquid pumping and drawing in beverage dispensing machines.
07.06 Identify external/internal assembly of beverage dispensing machine.
07.07 Replace pressurized gas containers.

08.0 DEMONSTRATE APPROPRIATE SANITATION PRACTICES--The student will be able to:

08.01 Demonstrate knowledge of NAMA public health regulations.
08.02 Demonstrate knowledge of NAMA equipment compliance code.
08.03 Demonstrate knowledge of University of Indiana test labs.
08.04 Demonstrate knowledge of role of health department inspectors.
08.05 Demonstrate knowledge of food handling procedures.
08.06 Evaluate food handling and storage based on transportation, temperature and time.
08.07 Conduct daily/weekly sanitation procedures on machines.
08.08 Conduct monthly preventative sanitary procedures on machines.
08.09 Conduct general field sanitation based on machine location, exterior construction and maintenance.

08.10 Evaluate water supply and disposal facilities.
08.11 Conduct inspection of sanitary delivery of product.
08.12 Evaluate shop and commissary sanitation.

09.0 PERFORM BASIC ELECTRICAL/ELECTRONIC REPAIRS--The student will be able to:

09.01 Apply basic electrical safety practices.
09.02 Identify the nature of electricity
09.03 Apply OHMS law.
09.04 Identify magnetism
09.05 Identify electrical components symbols and diagrams.
09.06 Apply basic electrical theory and calculations.
09.07 Calculate and measure electrical valves in series and parallel circuits.
09.08 Compare alternating- to direct-current.
09.09 Test electrical components.
09.10 Test single and three phase motors.
09.11 Test capacitors and rectifiers.
09.12 Test solid state components.
09.13 Design electrical systems.
09.14 Test coils, relays and solenoids.
09.15 Describe electrodes applications.

10.0 PERFORM PIPING AND PLUMBING REPAIRS--The student will be able to:

10.01 Demonstrate basic plumbing skills.
10.02 Braze aluminum tubing.
10.03 Bend copper tubing.
10.04 Braze weld copper tubing.
10.05 Cut steel pipe.
10.06 Cut PVC pipe.
10.07 Flare copper tubing.
10.08 Flare copper tubing.
10.09 Braze two metal jobs.
10.10 Assemble specialized fillings.
10.11 Install pipe.
10.12 Secure pipe to various surfaces.
10.13 Install water pipes.
10.14 Pressure test water system.
10.15 Connect machine plumbing to water supply.
10.16 Install drainage for machine as appropriate.

11.0 PERFORM REFRIGERATION SYSTEM REPAIRS--The student will be able to:

11.01 Apply principles of thermodynamics to vending refrigeration.
11.02 Apply HEAT ENTHALPY chart BTU/lb.
11.03 Apply principles of latent heat, effective heat, super heat.
11.04 Apply principles of Boyles Law and Charles Law.
11.05 Apply principles in changes in state of matter.
11.06 Apply principles of conduction/convection heat.

11.07 Define function of refrigeration components: compressors, controls evaporators, condensors, accession driers, filters, defrost, by-pass.

11.08 Trouble shoot the system by:
- a. identifying the problem,
- b. determining proper solution, time, cost, and parts availability,
- c. making repairs, and
- d. testing.

11.09 Describe construction and function of hermetic compressor.

11.10 Describe construction and function of evaporator post.

11.11 Describe construction and function of condensors-static and depromic.

11.12 Describe construction and function of minor components.

11.13 Test and exchange refrigeration units.

12.0 PERFORM MAJOR MACHINE MAINTENANCE--The student will be able to:

12.01 Repair food vending machines by:
- a. identifying machine through age dating,
- b. identifying and clearing coin mechanism,
- c. repairing/replacing parts, and
- d. checking for preventative maintenance.

12.02 Repair beverage vending machine by:
- a. identifying cup dispensing variances in hot and cold machines,
- b. trouble shooting refrigeration devices,
- c. evaluating liquid principles through pumping and draining,
- d. checking external/internal assembly,
- e. checking coin mechanism, and
- f. refinishing damaged surface.

12.03 Repair recreational machine by:
- a. assessing nature of problems,
- b. assessing coin mechanism,
- c. repairing/replacing parts,
- d. finishing metal/wood surfaces, and
- e. testing for operation.

13.0 REPAIR AND REFINISH METAL--The student will be able to:

13.01 Use primers and sealers.

13.02 Clean surface for refinishing.

13.03 Sand painted surface.

13.04 Strip damaged surface.

13.05 Fill depressed area with fillers.

13.06 Apply corrosion-control materials.

13.07 Select paints as appropriate.

13.08 Apply paint or polish as appropriate.

14.0 MAINTAIN RECORDS AND MEET SANITATION STANDARDS--The student will be able to:

14.01 Maintain service records.
14.02 Complete and file service call records.
14.03 Be familiar with the practice governing health codes.
14.04 Comply with state and county health code standards.
14.05 Demonstrate practice of personnel health.
14.06 Use water test equipment.

15.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

15.01 Write logical and understandable statements, or phrases, to accurately fill out forms/invoices commonly used in business and industry.
15.02 Read and understand graphs, charts, diagrams, and tables commonly used in this industry/occupation area.
15.03 Read and follow written and oral instructions.
15.04 Answer and ask questions coherently and concisely.
15.05 Read critically by recognizing assumptions and implications and by evaluating ideas.
15.06 Demonstrate appropriate telephone/communication skills.

16.0 DEMONSTRATE APPROPRIATE MATH SKILLS--The student will be able to:

16.01 Solve problems for volume, weight, area, circumference and perimeter measurements for rectangles, squares, and cylinders.
16.02 Measure tolerance(s) on horizontal and vertical surfaces using millimeters, centimeters, feet and inches.
16.03 Add, subtract, multiply and divide using fractions, decimals, and whole numbers.
16.04 Determine the correct purchase price, to include sales tax for a materials list containing a minimum of six items.
16.05 Demonstrate an understanding of federal, state and local taxes and their computation.

17.0 DEMONSTRATE APPROPRIATE UNDERSTANDING OF BASIC SCIENCE--The student will be able to:

17.01 Understand molecular action as a result of temperature extremes, chemical reaction, and moisture content.
17.02 Draw conclusions or make inferences from data.
17.03 Identify health related problems which may result from exposure to work related chemicals and hazardous materials, and know the proper precautions required for handling such materials.
17.04 Understand pressure measurement in terms of P.S.I., inches of mercury, and K.P.A.

18.0 DEMONSTRATE EMPLOYABILITY SKILLS--The student will be able to:

18.01 Conduct a job search.
18.02 Secure information about a job.

18.03 Identify documents which may be required when applying for a job interview.
18.04 Complete a job application form correctly.
18.05 Demonstrate competence in job interview techniques.
18.06 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
18.07 Identify acceptable work habits.
18.08 Demonstrate knowledge of how to make appropriate job changes.
18.09 Demonstrate acceptable employee health habits.
18.10 Demonstrate a knowledge of the "Florida Right-To-Know Law" as recorded in Florida Statutes Chapter 442.

19.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

19.01 Define entrepreneurship.
19.02 Describe the importance of entrepreneurship to the American economy.
19.03 List the advantages and disadvantages of business ownership.
19.04 Identify the risks involved in ownership of a business.
19.05 Identify the necessary personal characteristics of a successful entrepreneur.
19.06 Identify the business skills needed to operate a small business efficiently and effectively.

July 1997

Florida Department of Education
CURRICULUM FRAMEWORK

Program Title:	Welding Technology
Occupational Area:	Industrial Education
	PSV
CIP Number	0615.061000
Grade Level	College Credits
Length	AS Degree/64

I. **MAJOR CONCEPTS/CONTENT:** The purpose of this program is to prepare students for employment as welding technicians (011.261-014), or to provide supplemental training for persons previously or currently employed in these occupations.

The content includes, but is not limited to, communication skills, leadership skills, human relations and employability skills, safe and efficient work practices, use of blueprints and shop drawings use of gases and/or welding processes, and brazing parts according to diagrams, blueprints or written specifications.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Welding industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues and health, safety, and environmental issues.

II. **LABORATORY ACTIVITIES:** Shop or laboratory activities are an integral part of this program and provide instruction in various processes and techniques of welding and fabrication skills, including oxyacetylene welding and cutting (OAW), brazing, arc welding (SMAW), MIG welding (GMAW), TIG welding (GTAW), certification test preparation, and use of current industry standards, practices, and techniques.

III. **SPECIAL NOTE:** The Vocational Industrial Clubs of America, Inc., is the appropriate vocational student organization for providing leadership training and for reinforcing specific vocational skills. Vocational Student Organizations, when provided, shall be an integral part of the vocational instructional program, and the activities of such organizations are defined as part of the curriculum in accordance with Rule 6A-6.064, FAC.

The cooperative method of instruction may be utilized for this program. Whenever the cooperative method is offered, the following is required for each student: a training plan, signed by the student, teacher and employer which includes instructional objectives and a list of on-the-job and in-school learning experiences; a work station which reflects equipment, skills and tasks relevant to the occupation the student has chosen as a

career goal. The student must receive compensation for work performed.

To be transferable statewide between institutions, this program/course must have been reviewed, and a "transfer value" assigned the curriculum content by the appropriate Statewide Course Numbering System discipline committee. This does not preclude institutions from developing specific program or course articulation agreements with each other.

The typical length of this program for the average achieving student is an Associate Degree.

IV. **INTENDED OUTCOMES:** After successfully completing the program, the student will be able to:

01.0 Apply basic shop skills.
02.0 Read blueprints.
03.0 Identify metals.
04.0 Apply gas welding skills.
05.0 Apply shielded metal arc welding skills (SMAW).
06.0 Apply gas tungsten arc welding skills (GTAW), (GMAW), (FCAW).
07.0 Apply gas metal arc welding (GMAW) and flux core arc welding (FCAW) skills.
08.0 Apply plasma arc skills.
09.0 Fabricate and weld pipe joints.
10.0 Perform combination welding skills.
11.0 Demonstrate appropriate communication skills.
12.0 Demonstrate appropriate math skills.
13.0 Demonstrate appropriate understanding of basic science.
14.0 Demonstrate employability skills.
15.0 Demonstrate an understanding of entrepreneurship.

July 1997

Florida Department of Education
STUDENT PERFORMANCE STANDARDS

Program Title: Welding Technology
Secondary Number:
Postsecondary Number: 0615.061000

01.0 APPLY BASIC SHOP SKILLS--The student will be able to:

- 01.01 Apply communications and leadership skills.
- 01.02 Apply safety practices.
- 01.03 Apply measuring skills.
- 01.04 Apply cutting skills.
- 01.05 Apply bending skills.
- 01.06 Apply drilling skills.
- 01.07 Apply punching skills.
- 01.08 Apply finishing skills.

02.0 READ BLUEPRINTS--The student will be able to:

- 02.01 Interpret welding symbols.
- 02.02 Interpret detail drawings.
- 02.03 List materials for fabrication from blueprint.
- 02.04 Develop shop drawings.

03.0 IDENTIFY METALS--The student will be able to:

- 03.01 Identify metals by appearance and weight.
- 03.02 Identify metals by spark test.
- 03.03 Classify metals by magnetic properties.

04.0 APPLY GAS WELDING SKILLS--The student will be able to:

- 04.01 Identify safety and set-up procedures.
- 04.02 Set-up oxy-fuel equipment.
- 04.03 Cut carbon steel using oxy-fuel equipment.
- 04.04 Run beads with gas welding equipment.
- 04.05 Gas weld carbon steel joints.
- 04.06 Braze ferrous and non ferrous metals.
- 04.07 Form metals with gas equipment.
- 04.08 Remove distortion using gas equipment.

05.0 APPLY SHIELDED METAL ARC WELDING SKILLS (SMAW)--The student will be able to:

- 05.01 Identify safety and set-up procedures.
- 05.02 Identify and select proper electrodes.
- 05.03 Set-up SMAW equipment.
- 05.04 Run beads with SMAW equipment.
- 05.05 Apply surfacing skills.
- 05.06 Weld single pass and multiple pass lap joints in all positions.
- 05.07 Weld outside corner joints in all positions.

05.08 Weld multiple pass "tee" joints in all positions.
05.09 Weld butt joints in all positions.
05.10 Weld and bend test coupons.
05.11 Cut with SMAW equipment.

06.0 APPLY GAS TUNGSTEN ARC WELDING SKILLS (GTAW)--The student will be able to:

06.01 Identify safety and set-up procedures.
06.02 Assemble and set-up GTAW equipment (TIG).
06.03 Run beads with GTAW equipment.
06.04 Weld aluminum joints with GTAW equipment.
06.05 Weld mild steel joints with GTAW equipment.
06.06 Weld stainless steel joints with GTAW equipment.

07.0 APPLY GAS METAL ARC WELDING SKILLS (GMAW) AND FLUX CORE ARC WELDING (FCAW) SKILLS--The student will be able to:

07.01 Identify safety and set-up procedures.
07.02 Assemble and set-up GMAW equipment.
07.03 Run beads with GMAW equipment (MIG).
07.04 Weld mild steel joints with GMAW equipment.
07.05 Weld aluminum joints with GMAW equipment.
07.06 Weld with flux core equipment (FCAW).

08.0 APPLY PLASMA ARC SKILLS--The student will be able to:

08.01 Identify safety and set-up procedures.
08.02 Assemble and set-up plasma arc equipment.
08.03 Cut with plasma arc equipment.

09.0 FABRICATE AND WELD PIPE JOINTS--The student will be able to:

09.01 Prepare pipe joints for welding.
09.02 Set-up and weld pipe joints.

10.0 PERFORM COMBINATION WELDING SKILLS--The student will be able to:

10.01 Repair products of ferrous and non-ferrous metals.
10.02 Fabricate products of ferrous and non-ferrous metals.

11.0 DEMONSTRATE APPROPRIATE COMMUNICATION SKILLS--The student will be able to:

11.01 Write logical and understandable statements, or phrases; accurately fill out forms/invoices commonly used in business and industry.
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